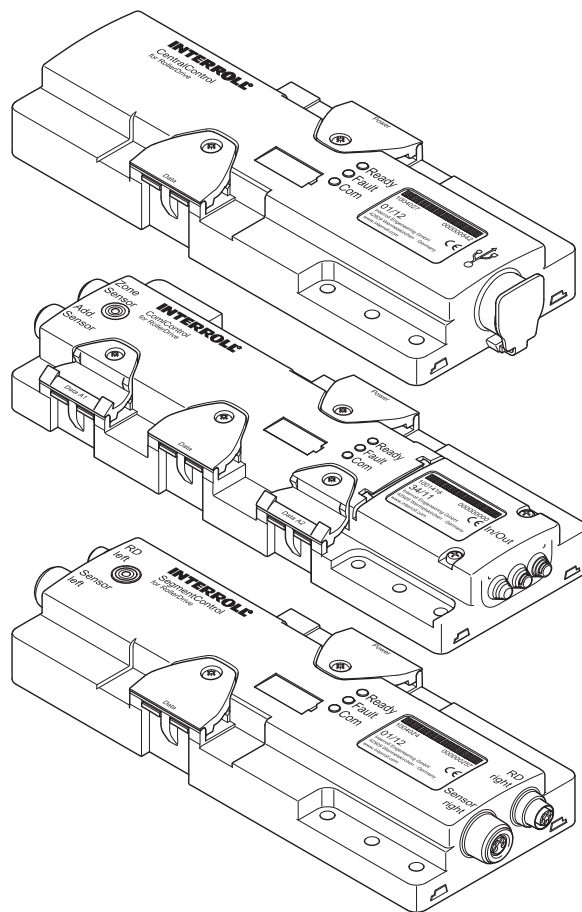




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User manual

Interroll

ConveyorControl system

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Table of contents

Introduction

Information about the manual	3
Warning notices in this manual	3
Further symbols	4

Safety

General safety instructions	5
Intended use	5
Unintended use	5
Qualified persons	5
Dangers	6
Interfaces to other devices	6
Operating modes	7

Product information

Product description	8
Description of functions	10
Structure	14
Scope of delivery	15
Label	16
Technical specifications	16
Dimensions	17

Transport and storage

Ambient conditions for transport and storage	18
Transport	18
Storage	18

Planning

General information	19
Install software	19
Basics	20
Start the Configurator	22
User interface	23
Functional concept	25
Constructing the conveyor line	26
Preparing to Address	30
Parameterizing modules	32
Overview of parameters	35

Assembly

Warning information for assembly	41
Assembly of ConveyorControl modules	41
Warning information relating to the electrical installation	43
Electrical installation	44
Example of connection	52

Initial startup and operation

Initial startup	53
Addressing modules	53
Downloading parameters	57
Self-test	58
Operation	60

Maintenance and cleaning

Warnings concerning maintenance and cleaning	61
Maintenance	61
Cleaning	61

Table of contents

Troubleshooting	
Meaning of the LEDs	62
Troubleshooting	66
Abandonment and disposal	
Shut-down	68
Disposal	68
Appendix	
Accessories	69
Possible wiring of the inputs	70
Possible wiring of the ComControl outputs	80
Glossary of parameters	82
Electrical data of connectors	89
Installation declaration	90

Introduction

Information about the manual

Contents

This manual contains important advice, notes and information about the ConveyorControl in all phases of its life cycle:

- Transport, assembly and start-up
- Safe operation, maintenance and troubleshooting, disposal
- Accessories

Validity of the manual

The manual describes the ConveyorControl as it is delivered by Interroll.

In addition to this manual, special contractual agreements and technical documents apply to special versions.

The manual is part of the product

- For trouble-free, safe operation and warranty claims, read the manual and follow the instructions before handling the ConveyorControl.
- Keep the manual near to the ConveyorControl.
- Pass the manual on to any subsequent operator or occupant of the ConveyorControl.
- Interroll does not accept any liability for faults or defects due to non-observance of this manual.
- If you have any questions after reading the operation manual, feel free to contact our customer service. See the last page for your local contact information.

Warning notices in this manual


The warning notices in this document refer to risks which may arise during usage of the ConveyorControl. The relevant warning notices are explained in the chapter on safety (see *"Safety"*, page 5) and at the beginning of each chapter.


There are three categories of danger. The following signal words are used in the document as required:

- Danger
- Warning
- Caution

Signal word	Meaning
Danger	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
Warning	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
Caution	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

Structure of warning notices



 **DANGER**

Nature and source of the hazard
Possible consequence of non-observance

➤ Information about how to avoid the hazard.

Introduction

Further symbols

NOTICE

This symbol identifies possible material damage.

➤ Information about how to avoid the damage.



This symbol displays safety instructions.



This symbol marks useful and important information.

➤ This symbol marks the steps that have to be carried out.

Italics designate a term from the software interface.

Safety

General safety instructions

The ConveyorControl has been built to comply with the state of the art. Nevertheless, users may encounter hazards during use:

- Risks of physical injury to the user or bystanders
- Adverse effects of the ConveyorControl and other circumstances.



Disregarding the warning notices in this manual may lead to serious injury.

- Always read the entire operating and safety instructions before starting to work with the ConveyorControl and follow the information contained therein in full.
- Only instructed and qualified persons may work with the ConveyorControl.
- Always keep the manual at hand when working at the ConveyorControl so you can consult it quickly if required.
- Always comply with relevant national safety regulations.
- If you have any questions after reading the operation manual, feel free to contact our customer service. See the last page for your local contact information.

Intended use

The ConveyorControl may only be used for industrial applications and in an industrial environment to control the RollerDrive EC310.

The ConveyorControl must be integrated into a conveyor or conveyor system. Any other use is considered inappropriate.

Any modifications that affect the safety of the product are not permitted.

The ConveyorControl must only be operated within the defined operating limits.

Unintended use

Use for anything other than the intended purpose requires approval by Interroll.

Qualified persons

Qualified persons are persons who read and understand the manual and, taking national regulations into account, can competently execute incidental work.

Only instructed and qualified persons may work with the ConveyorControl system, taking the following into account:

- the relevant manuals and diagrams,
- the warning and safety instructions in this manual,
- the system specific regulations and requirements,
- national or local regulations and requirements for safety and accident prevention.

Safety

Dangers



The following list provides information about the various types of danger or damage that may occur while working with the ConveyorControl.

Bodily injury

- Maintenance or repair work must only be performed by authorized and qualified persons in accordance with the applicable regulations.
- Before using the ConveyorControl, ensure that no unauthorized persons are near the conveyor.

Electricity

- Only perform installation and maintenance work after you have switched off the power.
- Ensure that the power cannot be turned on accidentally.

Working environment

- Do not use the ConveyorControl in areas where there is a hazard of explosion.
- Remove equipment or material which is not required from the workspace.

Faults during operation

- Regularly inspect the ConveyorControl components for visible damage.
- If you notice smoke, switch off the power immediately and ensure that it cannot be switched on again accidentally.
- Contact qualified personnel immediately to find the source of the fault.

Maintenance

- Because the product does not require maintenance, you only need to inspect the ConveyorControl components regularly for visible damage and that all cables and screws are firmly in place.

Accidental motor starts

- Exercise caution when installing or performing maintenance on the ConveyorControl components and when troubleshooting, as a start signal may accidentally be triggered, unintentionally starting one of the connected motors.

Interfaces to other devices

When assembling the ConveyorControl components in a conveyor, further hazards may occur. These hazards are not part of this manual and have to be analyzed during the design, installation and startup of the conveyor.

- After assembling the ConveyorControl in a conveyor, check the whole system for new potential dangerous spots before switching on.

Safety

Operating modes

Normal mode	Operation following installation at the user's premises as control components in a conveyor in a complete system.
Special mode	All operating modes which are required to guarantee and maintain safe and normal operation.

Special operating mode	Explanation	Comment
Transport/Storage	Loading and unloading, transport and storage	-
Assembly/Initial start-up	Installation at the end customer's and performing the test run	When de-energized
Cleaning	External cleaning	When de-energized
Maintenance/Repairs	Maintenance and inspection tasks	When de-energized
Troubleshooting	Troubleshooting in the event of a fault	When de-energized
Fault elimination	Eliminating the fault	When de-energized
Shut-down	Dismantling from the conveyor	When de-energized
Disposal	Disposal of ConveyorControl system and packaging	-

Product information

Product description

The ConveyorControl system is a control system for conveyors which allows many parameters to be set and can thus be used very flexibly. It can work completely independently; following successful addressing and parameterization, no external control computer or PLC are required.

The ConveyorControl comprises the following components:

- CentralControl or GatewayControl
- SegmentControl
- ComControl
- Configurator
- Accessories: Flat cable, power supply unit, addressing magnet

CentralControl

The CentralControl monitors the correct connection and functioning of the individual ConveyorControl modules. It is connected via the bus communication with these modules and can thus recognize and assess various system fault types. The faults which occur are displayed via three LEDs.

The CentralControl must be connected to one end of the bus line. It features a terminating resistor which is required for the bus line. A ComControl with activated terminating resistor must be connected to the other end of the bus line. There must be a maximum of one CentralControl per conveyor line.

SegmentControl

The SegmentControl can control one or two zones in a conveyor. A sensor must be evaluated and a RollerDrive controlled in each zone. The functionality of the SegmentControl can be set flexibly, e.g., the sensor logic, the parameters of the RollerDrive and the release mode parameters can be set.

Faults which occur, e.g., in connection with the RollerDrive, sensors or release mode are displayed via LEDs. When a fault occurs or is remedied, the SegmentControl reacts in a specified manner which is dependent on the fault in question and which can be set.

If two drives per zone are required in a conveyor system, a second RollerDrive can be connected to the SegmentControl. This is designated as the "Slave RollerDrive" and, if parameterized accordingly, receives the same commands as the first RollerDrive.

To function within the ConveyorControl a SegmentControl requires at least one CentralControl or GatewayControl and a ComControl.

Product information

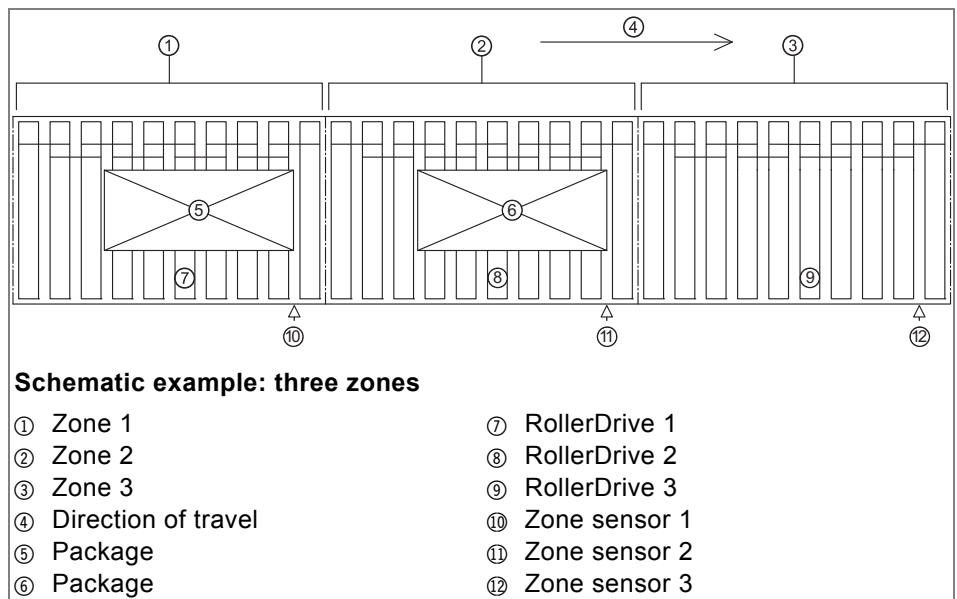
ComControl	<p>The ComControl must control one zone. A sensor must be evaluated and a RollerDrive controlled in each zone. In addition, two further inputs and three outputs can be connected. The functionality and logic options of the ComControl can be flexibly set.</p> <p>The ComControl offers the option of branching off the bus line. With the ComControl at the end of a bus line a terminating resistor can be switched on via a dip switch. This is necessary to terminate the bus line at the end. A non-switchable terminating resistor is integrated at the connections <i>Data A1</i> and <i>Data A2</i>.</p> <p>Faults which occur, e.g., in connection with the RollerDrive, sensors or release mode are displayed via LEDs and can be read out via an output which is parameterized accordingly.</p> <p>To function within the ConveyorControl a ComControl requires at least one CentralControl or GatewayControl.</p>
Configurator	<p>The ConveyorControl Configurator software serves to address and parameterize the individual modules in the ConveyorControl. The conveyor can be recreated virtually and configured according to requirements.</p>
Accessories	<p>In addition to the ConveyorControl modules, further accessories are also available from Interroll:</p> <ul style="list-style-type: none">• Only the power supply unit ConveyorControl from Interroll may be used to supply the power to the PowerControl modules.• Only the flat cable from Interroll may be used for the power supply and for bus communication.

Zero pressure accumulation conveying

Description of functions

The ConveyorControl system allows packages to be conveyed without accumulation pressure. This means that packages are transported without coming into contact with each other. To achieve this, the conveyor line is subdivided into zones. One zone consists of a RollerDrive, several idler rollers, a control module and corresponding sensors.

Zero pressure accumulation conveying is achieved by there being only one package in every zone and by the zones retaining the package until the downstream zone is detected as being "unblocked" by the corresponding sensor. When accumulation occurs, a signal is transmitted upstream to retain the next package. A gap is always left between the goods being transported so that no accumulation pressure occurs.



A package is conveyed until it either reaches the last zone on the conveyor line or the last unblocked zone before another package. In both cases it is retained in the specific zone.

In the above example, package ⑥ is automatically transported to zone 3. When the rear edge of package ⑥ leaves zone sensor 2, RollerDrive 1 starts immediately and package ⑤ is transported to zone 2 (single release). The afterrun time (see *"RollerDrive run-on time (AfterRunTime)"*, page 13) starts as soon as package ⑤ leaves zone sensor 1.

When the conveyor is operated in train release mode, after a start signal for the front package all packages are simultaneously transported forward into the next zone. Using the parameter PZ12, the delayed start of the individual zones can be set.

If there is a package in all three zones and the package in zone 2 is removed manually, RollerDrive 2 rotates immediately. If zone sensor 2 is not blocked again, on expiry of a delay period, the zone is defined as unblocked. The delay period is defined via the parameter PZ11 ("PermissionDelay") between 0 and 10 seconds. If the parameter is set to 0, the package is transported directly from zone 1 to zone 2 if zone sensor 2 is unblocked.

Product information

Initialization

Initialization serves to switch the conveyor line to a defined state. This is achieved as follows: In all zones with an unblocked zone sensor the RollerDrives rotate until the front edge of a package is detected by the zone sensor. Once a package has been detected, the RollerDrive stops in the relevant zone. If no package is detected by a zone sensor during initialization, the respective zone is regarded as unblocked. In those zones with a blocked zone sensor at the start of initialization, the RollerDrives are not started.

There is initialization in the following cases:

- following the successful downloading of parameters
- when the conveyor is started (operating voltage is switched on)
- when an error is remedied
- when control signals are removed e.g., *Clear* or *Stop D*

The set parameters are used during initialization. This means, for example, that the RollerDrive rotates at the set speed or the sensor transfers the signals in the selected logic type.

The initialization time can be set using the parameters (PZ14) global and PZ15 (local). If a parameter is set to 0 seconds, the relevant initialization is switched off. PZ14 = 0 means, for example, that there is no initialization after switching on the power supply or after removal of the *Clear* signal.

There are two different types of initialization:

- Global initialization: all zones in the conveyor perform initialization at the same time
- Local initialization: only certain zones perform initialization (e.g., zones in which an error was remedied)



If all zones are empty during initialization, all RollerDrives must rotate. If individual RollerDrives do not rotate even though the zone is unblocked, this could be due to the incorrect setting of the sensors (PNP/NPN or normally open / normally closed).

Feedback of energy / Overvoltage protection

If the RollerDrive is stopped or if the speed is reduced abruptly, the kinetic energy of the package in the RollerDrive is regeneratively converted into electrical energy. This energy is fed back into the ConveyorControl system where it can be used by other RollerDrive.

If more energy is fed back than used, the excess energy converted into heat by a brake chopper resistor in the ComControl or SegmentControl. The brake chopper resistor is activated when the voltage exceeds 26 V. As such, excessively high voltages within the ConveyorControl system are avoided.

Product information

Temperature protection

If operational conditions mean that the brake chopper is switched on so often that the upper temperature limit of approx. 90°C (measured internally) is reached, then the SegmentControl/ComControl switches off. If temperature protection is active, this is shown on the LED display. When the SegmentControl/ComControl has cooled down, the RollerDrive restarts automatically when a signal is pending. This temperature protection cannot be avoided with a voltage reset, even then it must be waited until the temperature has fallen sufficiently.



CAUTION

Unintended start-up of the RollerDrive following cooling down of the SegmentControl/ComControl

Danger of crushing of limbs and damage to goods

- Ensure that no start signal is pending during the cooling-down process.

Interfaces to other systems

With the help of the inputs on the ComControl, signals from upstream systems can be used and further processed (see *"Possible wiring of the inputs"*, page 70), e. g., an external signal can be evaluated as a start signal for the first zone.

Equally, signals from the last zone (e. g., the zone status) can be output via the outputs of the ComControl in order to make them available to downstream systems (see *"Possible wiring of the ComControl outputs"*, page 80).

Product information

Time-outs

Time-out when leaving the zone sensor (*TimeOut1*)

The following delays and time-outs can be used:

With this time-out it can be monitored whether packages are jammed and thus can no longer be transported.

After starting transportation of a package, the blocked zone sensor must become unblocked after the specified period of time (can be set using parameter PZ6). If the sensor is still blocked at the end of this time period, *TimeOut1* occurs.

Parameter PZ7 can be used to set whether the conveying mode is to be stopped in this case. If the parameter *PZ 7 = Ignore error*, the RollerDrive will continue to rotate until the sensor becomes unblocked and the subsequent switch-off delay time has expired.

The error can be reset by pushing the package manually into the detection area of the zone sensor in the downstream zone. After resetting, the subsequent zone runs a local initialization.

Time-out when reaching the zone sensor (*TimeOut2*)

With this time-out it can be monitored whether packages have been removed manually or have fallen out. As soon as a package has left the detection area of a zone sensor, the time required until it reaches the next zone sensor is measured. If this is longer than the specified time (can be set using parameter PZ8), *TimeOut2* occurs. Parameter PZ9 can be used to set whether the conveying mode is to be stopped or continued in this case. With the setting *PZ9 = Ignore error*, the RollerDrive continues to rotate until another package blocks the zone sensor.

The error can be reset by blocking the zone sensor in question.

RollerDrive run-on time (*AfterRunTime*)

Once a package has left the sensor of a zone, then the RollerDrive in this zone continues to rotate for up to 10 seconds (can be set using parameter PZ10). At the end of this period, the RollerDrive stops, providing no new package is transferred from the upstream zone.

This feature provides the following benefits:

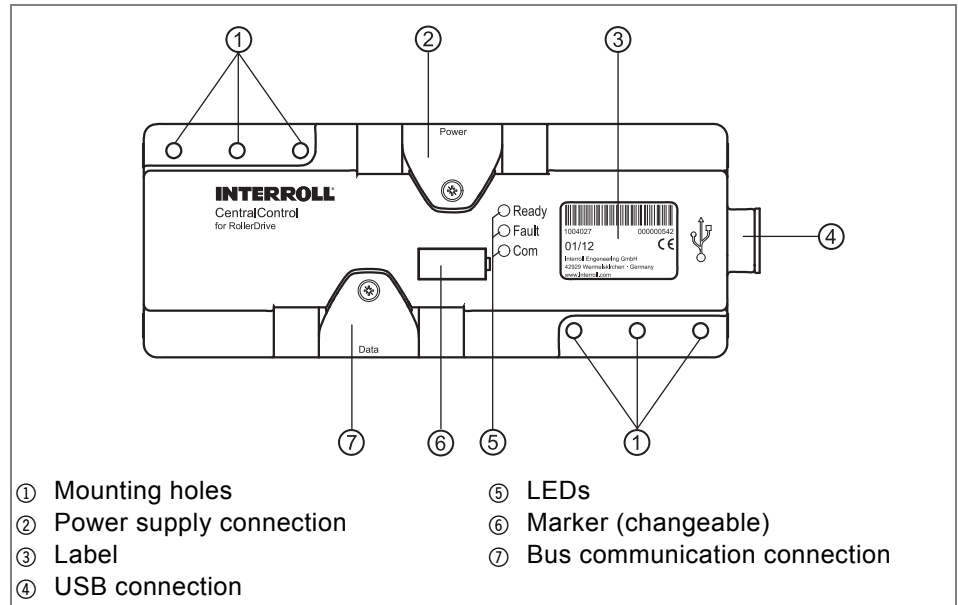
- Avoidance of unnecessary start/stop operation if there are no gaps between the packages.
- Energy-savings by switching off the RollerDrive if no further packages have to be transported.

Removing a package from the detection area of the zone sensor (*PermissionDelay*)

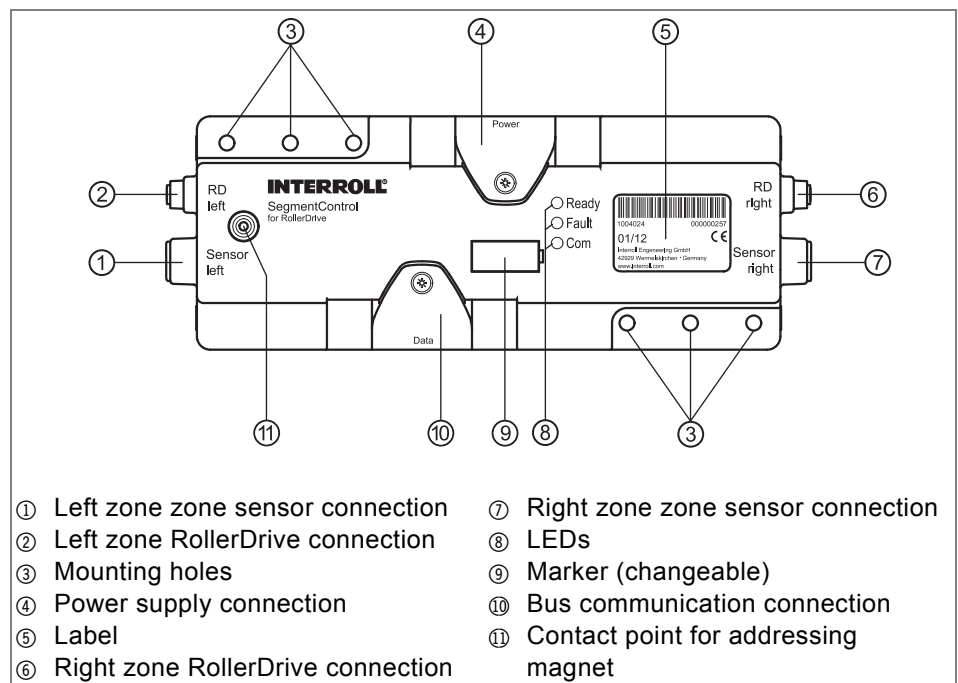
If the zone sensor becomes unblocked following a manual intervention (pulling back or removal of a package which has already stopped), the RollerDrive continues to rotate this zone for up to 10 seconds (can be set using parameter PZ11) in order to transport the package in the detection area of the zone sensor again. During this time a signal is not sent to the upstream zone stating that the zone is unblocked. This is to prevent an other package from moving in the zone. If the sensor is not reblocked during this time, a unblocked message is sent to the upstream zone.

Structure

CentralControl

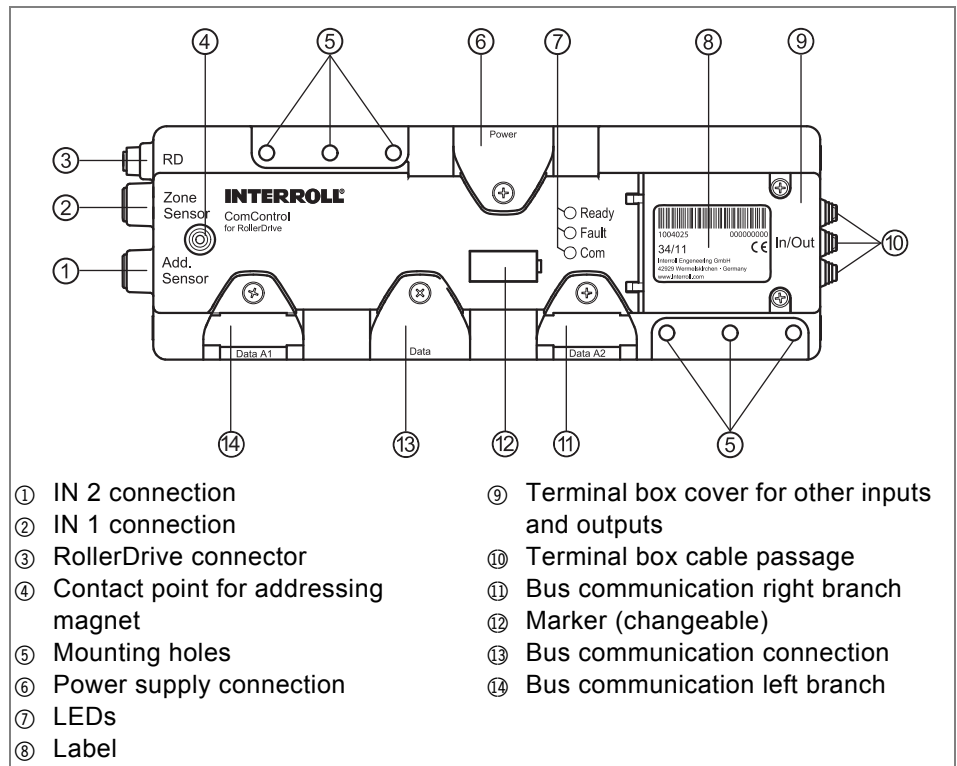


SegmentControl



Product information

ComControl



Scope of delivery

CentralControl

The CentralControl contains the following components:

- CentralControl
- 2 end caps to terminate the flat cable - left design
- 2 end caps to terminate the flat cable - right design
- USB stick with software ConveyorControl Configurator
- Addressing magnet

SegmentControl

The SegmentControl contains the following components:

- SegmentControl
- M8 blind cap for a sensor connection
- M8 blind cap for a RollerDrive connection
- End cap to terminate the flat cable - left design
- End cap to terminate the flat cable - right design

ComControl

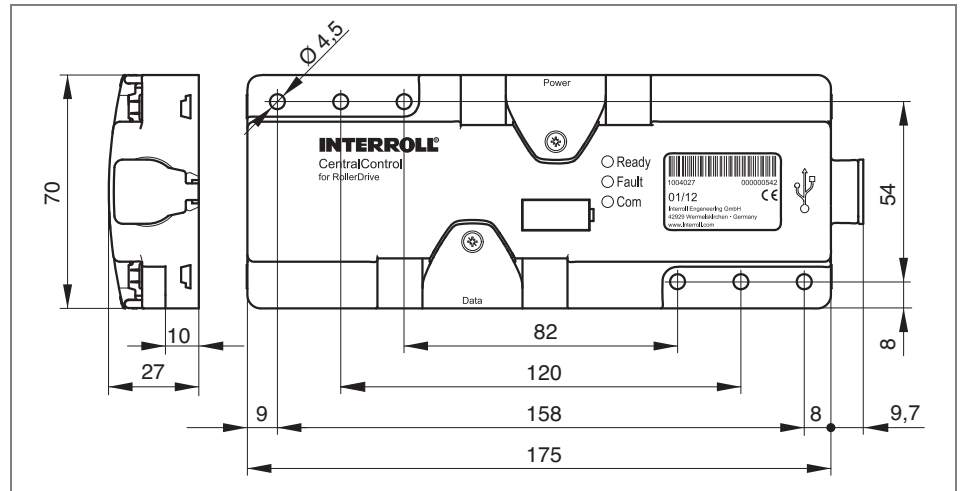
The ComControl contains the following components:

- ComControl
- M8 blind cap for the input connection IN 1 or IN 2
- 2 short flat cables with two sealed ends
- 3 end caps to terminate the flat cable - left design
- 3 end caps to terminate the flat cable - right design

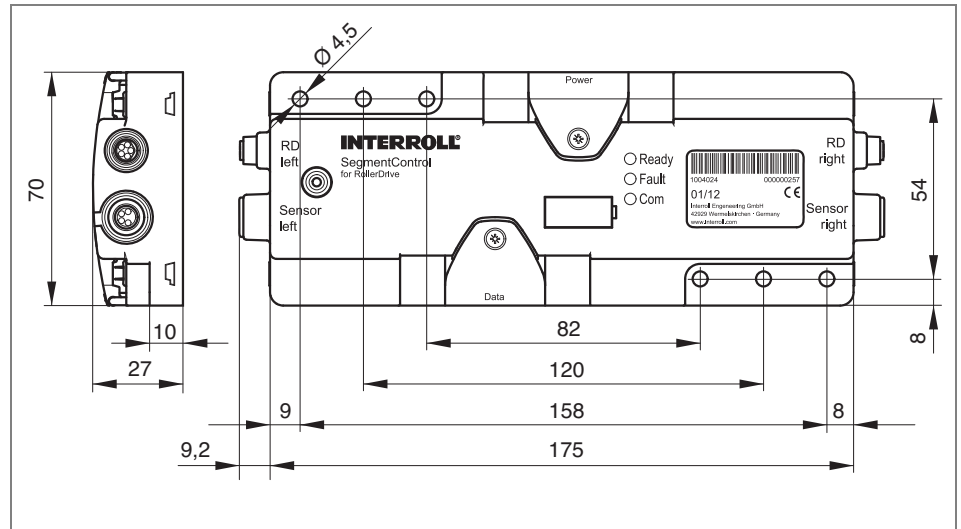
Product information

Dimensions

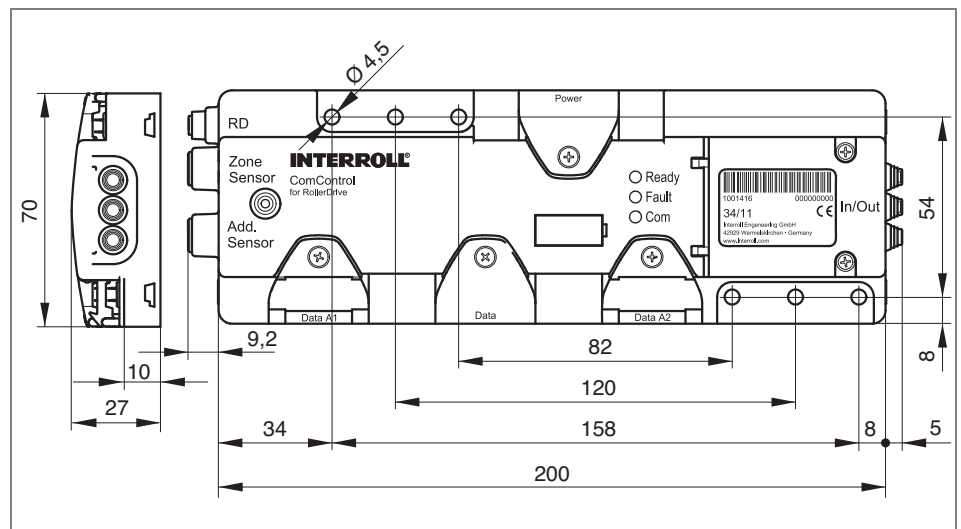
CentralControl



SegmentControl



ComControl



Transport and storage

Ambient conditions for transport and storage

Permissible ambient temperature	-40 °C to +85 °C (-40 °F to 185 °F)
Permissible relative humidity	max. 93% @ 40°C (104 °F), 14 day, non-condensing (IEC 68-2-78, DIN EN 60068-2-78)
Temperature change	1 K/min, 3 h (two cycles in acc. with IEC 68-2-14)

Transport

- Every ConveyorControl system module is packaged in its own cardboard box.

NOTICE

There is a risk of damage to property if transported incorrectly

- Only qualified and authorized persons should transport the product.
 - Follow the instructions below.
- Do not stack more than four cardboard boxes on top of each other.
 - Check that the boxes are correctly fixed in place prior to transport.
 - Avoid serious impacts during transport.
 - Check every ConveyorControl system module for visible damage after transport.
 - In the event of damage, take photos of the damaged parts.
 - To maintain the warranty, report any damage caused by transport instantly to the transport company and Interroll.
 - Do not expose the ConveyorControl system modules to large temperature fluctuations as this could result in condensation.

Storage

NOTICE

Risk of damage to property due to improper storage

- Do not stack more than four cardboard boxes on top of each other.
- Inspect each ConveyorControl module for damage after storage.

Planning

The conveyor can be virtually planned in advance using the ConveyorControl Configurators (referred to in the following as the Configurator). All the module parameters can be set offline and then downloaded collectively to the real conveyor.

General information

The Configurator has been developed for use together with the operating system Microsoft Windows XP Professional, Version 2002, Service Pack 3.

The Configurator can be used in the languages English and German. Some system-based information is always shown in the language used by the operating system regardless of the language set. For some technical terms a translation has not been provided in order to aid an understanding of the concept.

The Configurator does not realize any safety functions with respect to personal protection, protection of the system and protection of the packages. The user is responsible for ensuring that dangerous operating states can not arise.

Changes to the software, including reverse engineering, are not permitted.

Liability for any damage to the user or third parties resulting from the installation and use of this software is ruled out.

Install software

The Configurator is included on an Interroll USB stick with every CentralControl and every GatewayControl. The USB stick cannot be purchased separately. The latest version of the Configurator can also be downloaded from www.interroll.com.



On connecting for the first time to a CentralControl supplied with operating voltage, the driver of the relevant USB port is installed. To this end, administrator rights are necessary.

- Ensure that administrator rights are available on the computer.
- Insert a USB stick into the computer.
 - If the autorun function is activated on the computer, installation starts automatically.
- If the autorun function is deactivated or if the software has been downloaded, call up the setup.exe file.
- Follow the instructions in the installation dialog.



The Configurator can be installed any number of times on any number of computers.

Planning

Basics

With the help of the Configurator, a conveyor with a maximum of 100 ConveyorControl modules can be planned, addressed and parameterized. The maximum permitted total length of bus communication is 200 m.

Within the Configurator the conveyor is designated as a project. Any number of projects can be created and, as such, any number of conveyors can be planned. Only one conveyor can be planned for each project. Planning comprises five steps. These steps are shown by gray arrows in the upper section. The selected step is shown in yellow.

The construction of the conveyor, preparation of addressing and the parameterization of the modules can be carried out without a connection to a specific conveyor. This helps to reduce the time needed for commissioning. There must be a USB connection to the conveyor in order to address and download the parameters to the modules.

A conveyor must comprise several ConveyorControl modules. Each of these modules can be parameterized individually. All parameter values have upper and lower limits; some values are subject to a plausibility check. If decimals are entered as parameter values, in the German language setting a decimal comma must be used, in the English language setting a decimal point must be used.



Addresses and parameters can only be downloaded from the computer to the ConveyorControl system; however they cannot be read out again. As such, the downloaded data should be saved in a project file which can be clearly assigned to the conveyor for possible subsequent changes. If an existing system is to be changed, this file can be used and changed accordingly. If this file is not available, the complete conveyor must be remapped, addressed and parameterized.

Operating instructions

Operation of the Configurator is based on the usual functionalities for graphical user interfaces. Elements can be selected by a mouse click or via a pull-down selection. Several elements can be selected if they are clicked on whilst the CTRL button is held down. All elements are selected with the key combination CTRL + A. Selected elements are shown in yellow.

Fields which cannot be changed are shown in light gray. Buttons which cannot be used are either blended out or shown in light gray.

Operating and function errors are shown via screen messages. Work with the Configurator can only continue once the cause of the error has been remedied and the logical order of the operating steps has been adhered to or once all input conditions have been satisfied.

The size of the elements on the working area can be changed with the zoom by moving the mouse wheel whilst the CTRL button is held down.

Planning

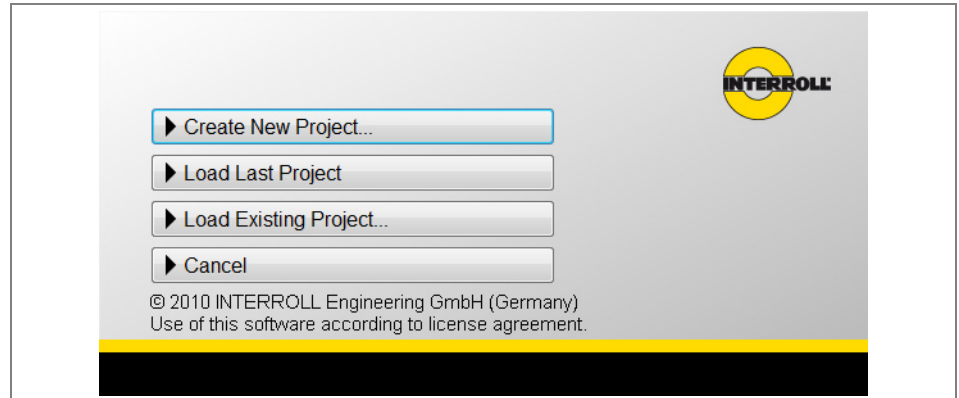
Definitions of terms

- **Zone:** The conveyor line is divided into zones. The zone length is based on the length of the longest package. One zone consists of a RollerDrive, several idler rollers, a control and a zone sensor (see *"Zero pressure accumulation conveying"*, page 10). In the Configurator a zone is symbolized as a gray square (see *"Constructing the conveyor line"*, page 26).
- **Slave RollerDrive:** For some applications the use of an additional RollerDrive per zone is necessary. With the ConveyorControl it is possible to connect a second RollerDrive (Slave RollerDrive) to a SegmentControl. This is only possible if the SegmentControl has only been assigned to one zone within the Configurator. The SegmentControl to which the Slave RollerDrive is connected can be selected with parameter PZ4. The Slave RollerDrive properties can be set separately, it is, however, recommended to specify the same values for the parameters of the zone's Slave RollerDrive and regular RollerDrive. The error reaction of a Slave RollerDrive follows the regular RollerDrive of the zone. An error is displayed both on the module to which the Slave RollerDrive is connected and on the module which controls the Slave RollerDrive.
- **Module:** Component of ConveyorControl (ComControl, SegmentControl, CentralControl or GatewayControl)
- **Conveyor line:** A conveyor line comprises any number of zones (max. 197) which are connected to each other. There is only one start and end zone.
- **Conveyor:** A conveyor comprises several conveyor lines. As such there are several start and end zones. In terms of the release modes, the conveyor lines work independently. Global signals, e.g., *Clear* or *Conveyor direction switch* always relate to the entire conveyor.
- **Power reset:** Turns off the power supply for the entire conveyor and then turns it on again (after a minimum of 3 seconds). If a conveyor is supplied by several power supply units, all power supply units must be switched on within a maximum of 10 seconds.

Planning

Start the Configurator

- Start the ConveyorControl Configurator program.
The start screen appears in which a yellow progress bar shows the loading progress. Once the Configurator has been fully loaded, the following selection window appears:



- Select the desired option.

Create a new project

A new project should be created for every conveyor.

- Enter the project name. Ideally a name should be used which can be clearly assigned to the conveyor at a later date.
- Click on the button behind the *Storage path* field to select the storage path.
- Click on the OK button.



When creating/opening a project file, a temporary hidden lock file with the name "lock.projektname.xml" is created. This serves to prevent the project file being opened by several users simultaneously and to also automatically save the project content every two minutes. When the project file is closed correctly, the temporary file is automatically deleted.

If the Configurator is not closed correctly, the lock file is not deleted and thus further editing of the project file is not possible.

- If the changes made before terminating the program are not to be saved, delete the "lock.projektname.xml" file. If the file is not shown, activate the option to display hidden files in the file manager.
- If the changes made before terminating the program are to be saved, rename the "lock.projektname.xml" file to "projektname.xml". If the file is not shown, activate the option to display hidden files in the file manager. If necessary also rename or delete the old project file.

Load the last project

This project opens the project which was last edited. This is the data on mapping, address planning as well as the parameters as last edited.

Load the current project

This option opens the Windows dialog window to select files.

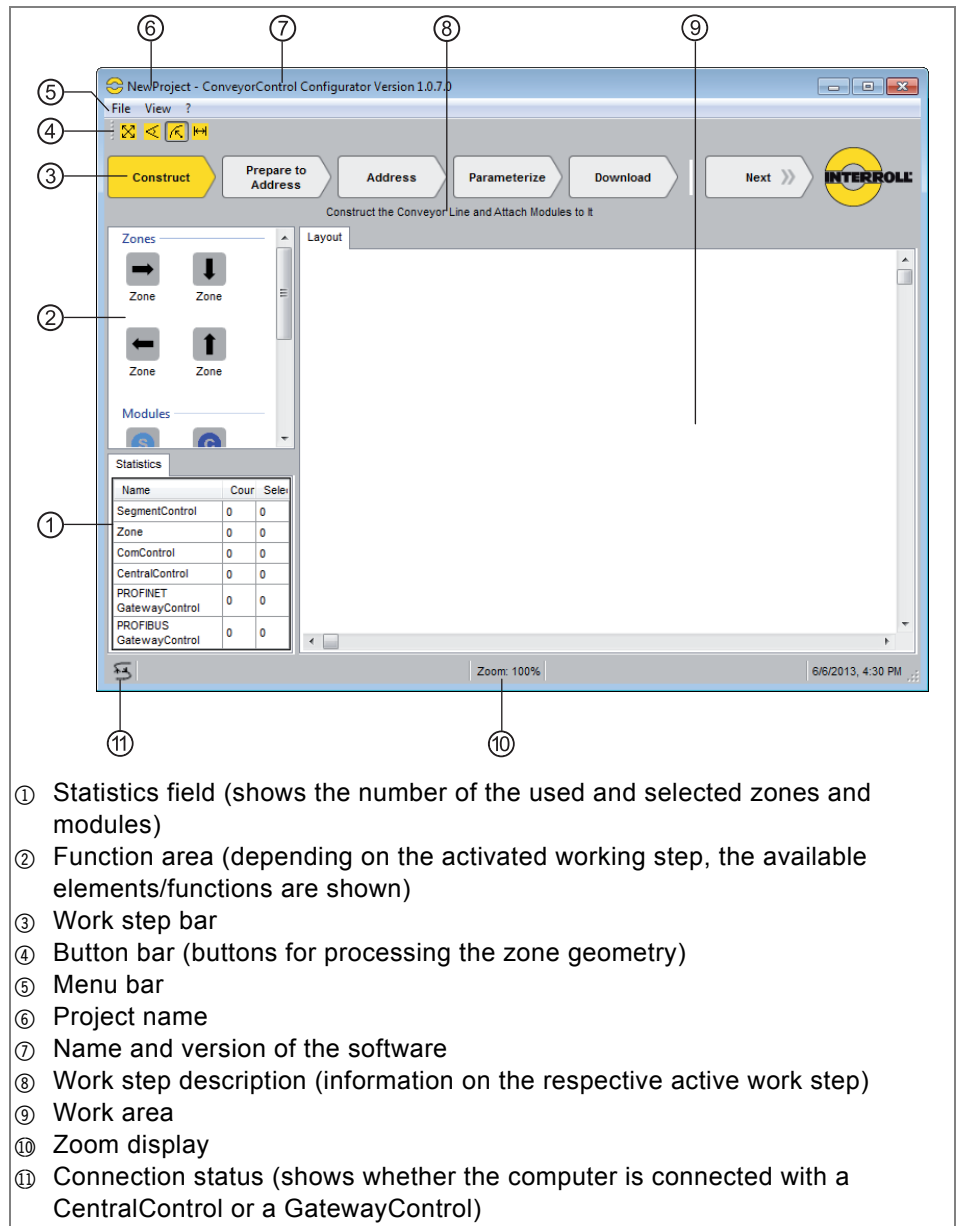
- Search for and select the desired project file.

Close

Closes the Configurator.

Planning

User interface



Planning

Menu bar

The functions in the *File* menu are typical for Windows (*New, Open, Save, Save as, Exit*). In addition the zone designations can be exported here.

In the *View* menu the following functions are available:

- *Language*: Upon installation English is set, each time the program is called up, the language last used is set.
- *Show Zone corner points*: The marking points are shown at the zone corner points. *
- *Show Zone dock points*: Circles are displayed at the possible dock points of the zone symbols as "catch" points. *
- *Zones show Node ID / Zones show user zone designation*: Switching between visualization of the actual zone address and the zone designation assigned by the user. The zone designation is shown as standard, the Node ID is only used for internal diagnosis purposes.

* graphic visualization see "*Constructing the conveyor line*", page 26

USB connection status

This symbol shows whether the computer is connected with a CentralControl or a GatewayControl)



Planning

Functional concept

The Configurator is divided into five steps which are based on the order of work when configuring a conveyor:

- *Construct* (see page 26)
- *Prepare to Address* (see page 30)
- *Address* (see page 53)
- *Parameterize* (see page 32)
- *Download* (see page 57)

The individual steps can be selected by clicking on the relevant buttons or by clicking on the *Next* button. Deviations from the specified order of processing are possible. For example, the steps *Construct*, *Prepare to Address* and *Parameterize* can be performed in preparation without the computer being connected to a conveyor. When this connection is subsequently created, only the steps *Address* and *Download* have to be performed.

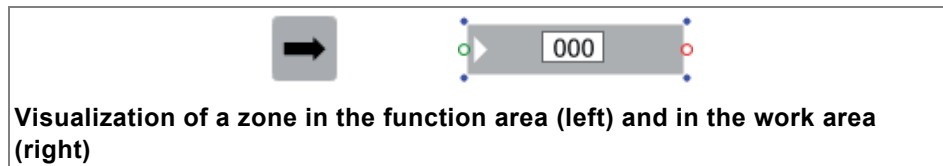
Construct	In the <i>Construct</i> step, the conveyor must be recreated from the individual zones and modules in a graphic interface. The length of the zones can be changed at will and/or bent, this allows a good likeness of the actual conveyor to be created.
Preparing to Address	For intercommunication of the modules, each module must have an unambiguous address. The addressing order is specified in this step.
Address	The modules are addressed in this step. As, for this, the computer has to be connected with the conveyor, this step is described in the chapter on "Commissioning" (see page 53).
Parameterize	Parameters must be assigned to each module. All parameters are set with recommended standard values. For the system to function, the following parameters must be adjusted as a minimum: RollerDrive speed, gear ratio and direction of rotation, sensor switching and assignment of the inputs on the ComControl.
Download	Once all parameters are set, the settings must be downloaded to the modules. As, for this, the computer has to be connected with the conveyor, this step is described in the chapter on "Commissioning" (see page 57).

Planning

Constructing the conveyor line

In this step, the conveyor line must be constructed in the Configurator. To this end, virtual zones with various conveyor directions (to the right, to the left, upward, downward) and ConveyorControl modules are available.





A zone is shown as a square in the Configurator:



The arrow shows the conveyor direction. The red and green circles are catch points with which several zones can be connected. The blue dots show the corner points. The catch and corner points can be hidden (see "Menu bar", page 24). The number is the zone designation (the last three digits of the zone designation are always shown).

A zone always contains at least one RollerDrive and a zone sensor which, however, is not shown separately. Zones which have been selected are highlighted in yellow.

Positioning zones

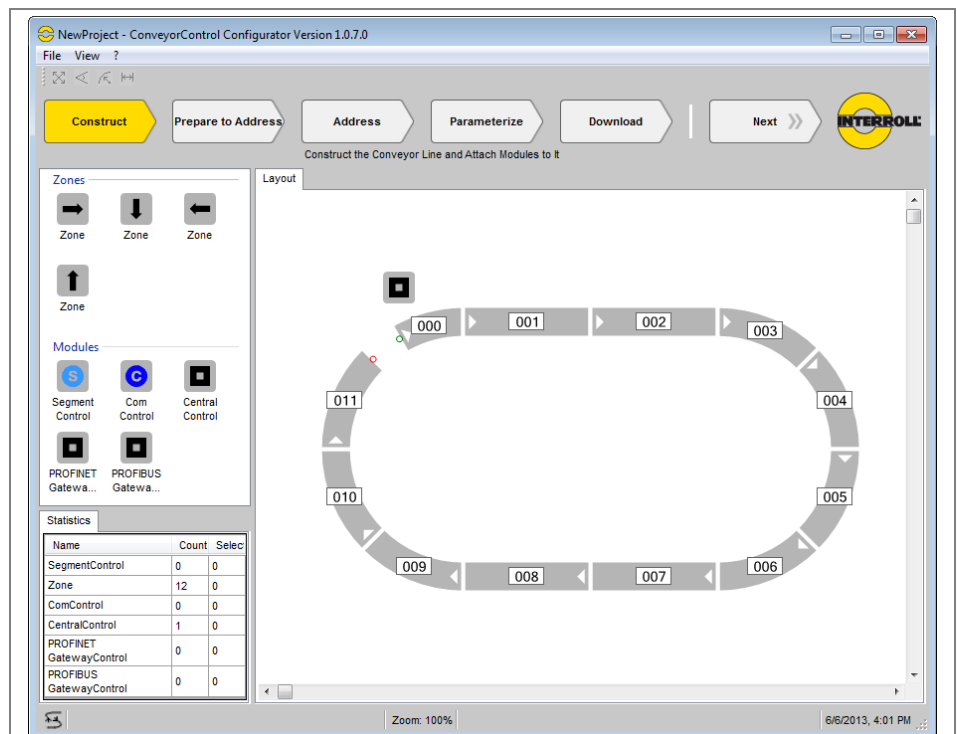
- Drag a zone from the function area to the work area with the mouse button held down.
- To change the shape of the zone click on one of the zone's catch points and drag on this with the mouse button held down. Reshaping can be restricted using the button bar as follows:
 -  Zone can be freely shaped
 -  Shaping with a constant angle of curvature
 -  Shaping with a constant radius
 -  Shaping with a constant length
- To change the angle of curvature in a controlled manner, click on the zone with the mouse wheel. This causes the zone to be curved by 15° with each click.
- Attach further zones in the same way.
- To connect two zones, merge their catch points. The zones are docked together.



Zones which are to be connected, must have the same conveyor direction. Only zones which have been docked together are functionally connected.

- To release docked zones, move these quickly with the mouse wheel held down. Slow dragging does not result in separation in order to avoid accidental break-up of a zone connection.
- To delete one or several zones, mark these and press the DEL button or click on the marked zone with the right mouse button and select *Delete object*.

Planning



Example set-up

Changing the zone designation

The zone designation is shown as a three-digit number which is automatically increased. The zones can be renamed if necessary in order to use personalized more appropriate designations.

- Click on the zone designation.
 - Enter an alternative zone designation (max. 16 characters) and confirm using the Return button.
- In the Configurator the last three characters of the zone designation are shown.

- To cancel renaming, press the Esc button.

Even if the zone designation is changed, the actual zone address in the background remains the same. If necessary, an allocation matrix can be exported in which the actual zone address for each user zone designation is listed. This matrix can be exported in a PLC in order to work there with the user zone designations.

- To export the matrix in the *File* menu select the command *Export zone designation....*

The allocation matrix is shown as a dual-column table. In the first column the user zone designation is given and in the second column the actual zone address.

- To save the matrix in the same folder as the project, click on *OK*.
- To save the matrix in another folder, click on the ... button, select the relevant folder and confirm with *OK*.

Planning

Allocating modules

Once all the zone symbols are placed on the work area, they must be allocated the ComControl or SegmentControl modules. Allocation must be identical to the real conveyor.

- Drag a module (ComControl or SegmentControl) from the function area to the work area with the mouse button held down.
- Drag the module at the middle of the long side of a zone in order to link it to this zone. If a SegmentControl is to be linked with two zones, drag the SegmentControl between the two zones.



The connection is symbolized by a line on the long side of the zone. This line is the color of the respective module (light blue for SegmentControl and dark blue for ComControl).



The module can be allocated to the right or left side of the zone, but not to both sides simultaneously. The side on which the module is positioned is designated by a blue line. This must reflect the actual situation as otherwise the left and right zone of a SegmentControl are mixed up.

To simplify electrical installation, if possible all modules should be positioned on the same side of the conveyor line. In the case of curves, wherever possible the modules should be positioned on the outside radius of the curve as the RollerDrive is connected on this side.

- Ensure that all zones on the work area are connected to a module. Zones and modules without a connection are highlighted red when moving to the next step.
- Delete zones and modules which are not used.

If modules have to be positioned on different sides, the following points must be taken into account:

- The rotating direction of the RollerDrive must be parameterized correctly if this is installed differently (see *"Parameterizing modules"*, page 32).
- When laying the flat cable for bus communication and the power supply, more flat cable is used on the other side (see *"Changing the side of assembly"*, page 44). This must be taken into account during planning in order not to exceed the maximum permissible length (200 m).
- To release the connection, mark the blue line (it turns yellow) and drag away with the mouse button held down. A zone can also be moved, reshaped or deleted with the allocated module.

Planning

Allocate CentralControl or GatewayControl to the conveyor

A CentralControl or GatewayControl is required for each conveyor. This, however, is not linked with a zone in the Configurator.

- Drag a CentralControl or GatewayControl from the function area to the work area with the mouse button held down.

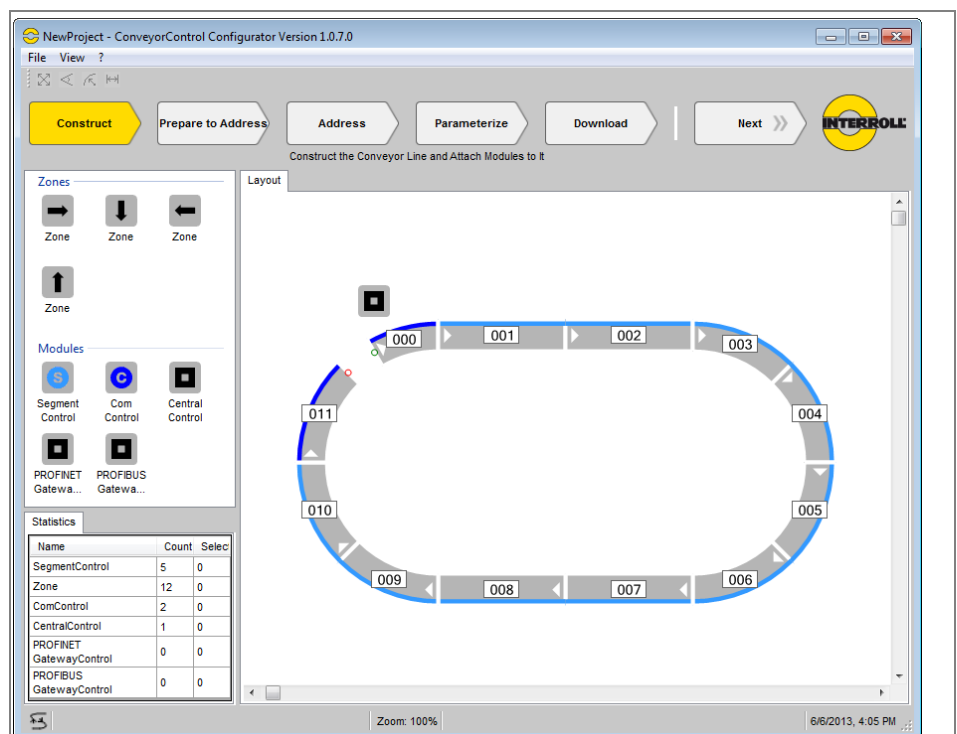
It can be positioned at any location on the work area. To ensure clarity, it is advised to position it at the point where the real conveyor is assembled.

Above all, this facilitates checks where a bus termination has already been implemented via the CentralControl. It can thus be detected that a ComControl must be positioned at the other end of the bus line.



If there is no CentralControl or GatewayControl available on the work area, an error message appears when moving to the *Address* step.

It can only ever be assigned to a CentralControl or GatewayControl of the conveyor. If a wrong selection is made, the wrong module must firstly be deleted in the work area before it can be replaced with the right one.



Zones with assigned modules

When checking, the following points must be considered:

- A bus line needs a start and an end. The start and end must not be connected to each other.
- The conveyor must have a defined start and end zone in the *Construct* step. That means there must be a point at which two zones are not connected to each other.

Planning

Preparing to Address

For functioning bus communication within the conveyor, every module must have an unambiguous address. The addresses are assigned by the Configurator.

In this step, the order of addressing is planned. It is not until the next step that the addresses are downloaded to the real modules (see "*Addressing modules*", page 53).

Every conveyor line must be addressed separately. If several conveyor lines belong to a conveyor and are thus planned in the Configurator in a project, the addressing must be prepared individually for each route.

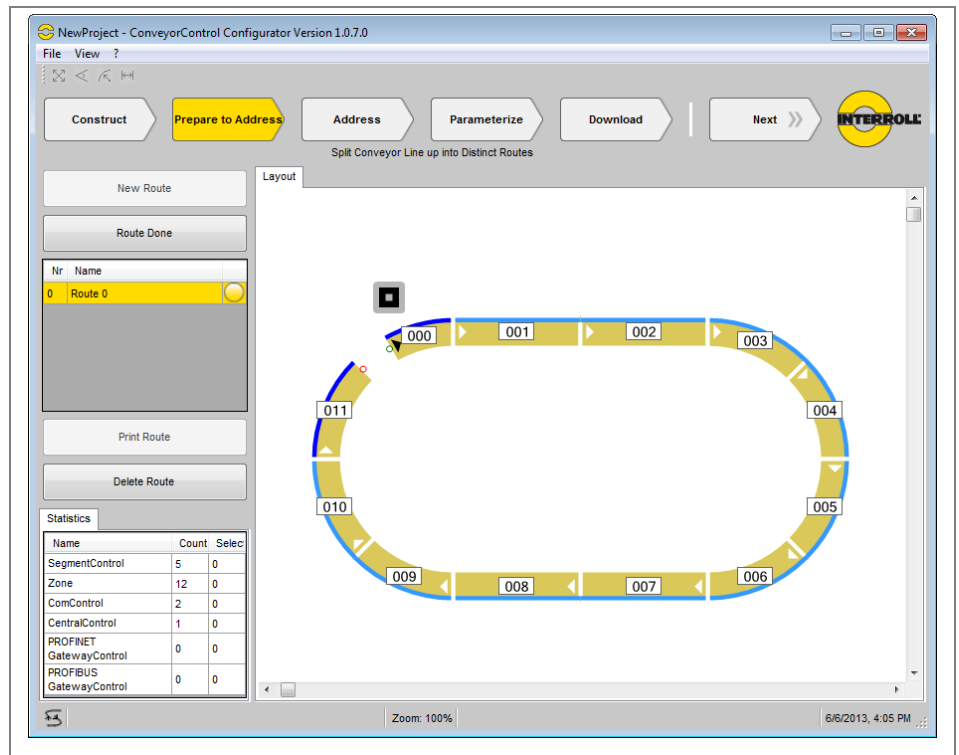


The difference between a zone and module must be observed. In the above example, the route comprises 12 zones and 7 modules. Only modules are addressed and not zones. A SegmentControl can be connected to two zones, but only has one address. By connecting the zone and module, the zones are automatically also detected.

Prerequisites:

- All zones in a conveyor line must be docked to each other.
 - Every module (SegmentControl or ComControl) must be assigned to a zone.
 - A conveyor line must have a start and end zone. A conveyor line must thus comprise at least two modules.
 - Addressing planning is only possible in the conveyor direction. The end zone must be in the conveyor direction vis-à-vis the start zone.
- In the work step bar, click on the *Prepare to Address* button.
The function area changes.
 - Click on the *New Route* button.
A new route is shown in the route list. The new route is automatically given the number 0 and the name *Route 0*. Additional routes are numbered consecutively.
 - If the route name is to be changed, click on the name and enter the desired name. An unambiguous name facilitates assignment of the route in the next steps.
 - Select the module which is to be addressed first.
The zone's conveyor direction display changes from white to black.
 - Click on the end module in the route. The end module must be located in the conveyor direction behind the start module. The end module selection can be changed any number of times.
The entire route is now highlighted light brown.

Planning



- Click on the *Route Done* button.
The route is now completely defined and is highlighted green. In the route list a green point appears next to the name.
- If the addressing is to be changed, mark the route in the route list, click on the *Delete Route* button and recreate the route as described above.



The button *Print Route* is only available if a route is concluded and is selected in the route list. Printing a route can, with complex conveyors, provide a better overview and thus facilitate addressing.



With long conveyor lines it may prove recommended to address the routes in several sections. As in the case of addressing errors (e. g., wrong order), the complete route has to be readdressed, this can reduce the time required in the event of errors.

The downloading of addresses to the modules is described in the chapter Commissioning (see "Addressing modules", page 53).

Planning

Parameterizing modules

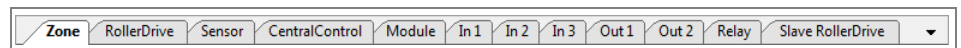
Given the numerous possible applications of the ConveyorControl the individual modules have to be parameterized to determine which functions the conveyor has to perform.

In this step the settings for the various parameters can be determined. They only become effective once they have been downloaded to the modules (see *"Downloading parameters", page 57*).

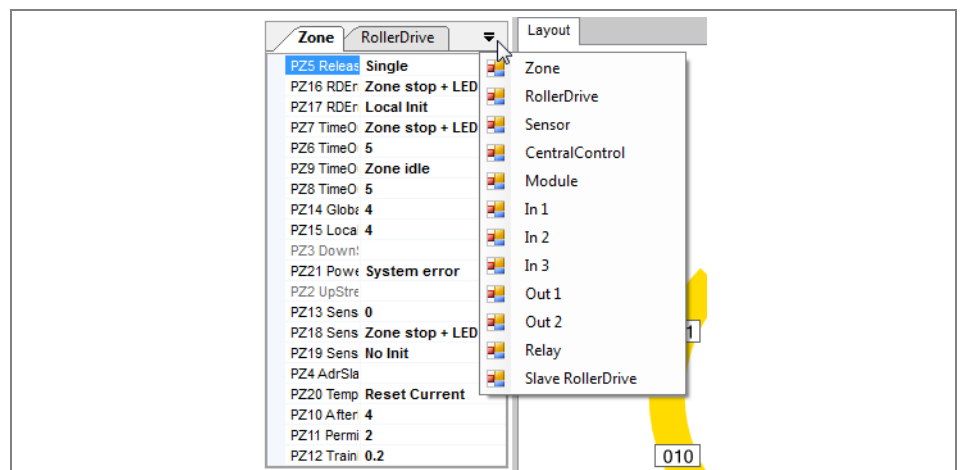
To provide a better overview, the parameters are divided into the following thematic groups:

- *Zone*
- *RollerDrive*
- *Sensor*
- *Module*
- *Slave RollerDrive*
- *In 1*
- *In 2*
- *In 3*
- *Out 1*
- *Out 2*
- *Relay*
- *CentralControl*

These groups are shown in the function area as tabs.



If the function area is too narrow to display all the tabs, the tabs which are not visible can be called up using the arrow to the right of the tabs.



Individual tabs can also be dragged onto a separate window in the work area. To do this, drag the tab with the left mouse button pressed down to where desired.

The tab display is based on which modules/zones have been selected on the work area. If no modules or zones are selected, no tabs and parameters are displayed.

Planning

Limitation and plausibility of the parameters

There are selection lists for most parameters from which preset values can be chosen. For the other parameters a value must be entered which lies between the specified maximum and minimum limits. These limits ensure that each parameter is set expediently. The rational interplay of the settings of all parameters is the responsibility of the user as this depends on diverse framework conditions (specific dimensions of the conveyor, properties of the packages, the sensors and RollerDrives used, interface signals etc.).

It is, for example, possible to set a slow conveying speed and, at the same time, a short time-out (time the package is allowed to take to leave a sensor). The Configurator allows such a combination of settings, however this is not recommended with long packages as this would trigger a release mode error.



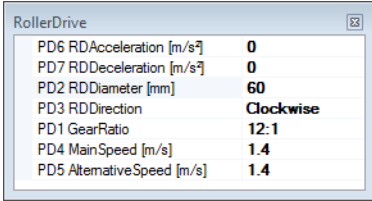
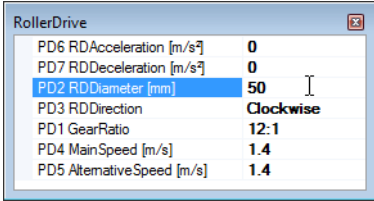
Enter the desired resulting speed as the speed. The Configurator converts the speed to various diameters.

Only the following parameters from the tabs *RollerDrive* and *Slave RollerDrive* are subject to a plausibility test:

- *PD1 GearRatio*
- *PD2 RDDiameter*
- *PD4 MainSpeed*
- *PD5 AlternativeSpeed*

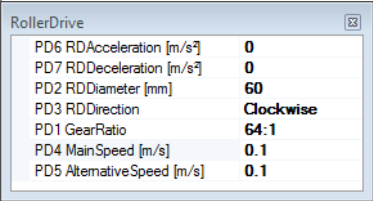
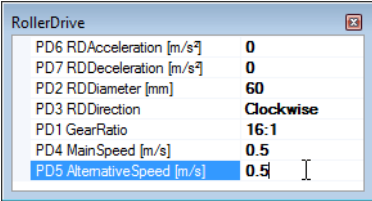
When a value is entered for these parameters, the Configurator checks whether this is appropriate for the values of the other three parameters. If this value is outside of the possible range, the value jumps back to the value last set.

Example 1:

Initial situation	Attempted entry
	

The speed 1.4 m/s can only be achieved with a gear ratio of 12:1 if the diameter of the RollerDrive is at least 54 mm. Entry of a diameter of 50 mm means that the last entered value of 60 mm is retained.

Example 2:

Initial situation	Attempted entry
	

The speed 0.5 m/s cannot be entered with a gear ratio of 64:1. The value jumps back to 0.1 m/s. The gear ratio 16:1 must be set, then the speed can be set to 0.5 m/s.

Planning

Setting parameters

Prerequisites for setting the parameters:

- The route has been completely mapped in the Configurator (see "*Constructing the conveyor line*", page 26).
- The following information is available:
 - Position and switching properties of the zone sensors
 - Arrangement of the modules on the conveyor and the connection position
 - Type of RollerDrives used (gear ratio, diameter, etc.)
 - Kind of the packages (for possible delay times, speed setting, time-out settings, acceleration/deceleration settings etc.)
 - Information on all inputs and outputs and their electric parameters
 - Further information, e.g., use of Slave RollerDrive
- In the work step bar, click on the *Parameterize* button.
- Select one or more modules and/or zones.

The set parameter values are assigned to the selected modules/zones. In most cases it is recommended to select several modules/zones and then to change the parameters.
- Change the parameters according to the requirements. To this end, click on the value of the parameter and then enter the desired value or select an entry from the drop-down list.

If the parameter name is shown in gray, the value cannot be changed.
- To reset all the parameters of the selected modules/zones to the factory settings, click on the *Reset Parameters* button.

The factory default setting of the parameters corresponds to the functioning of the Interroll ZoneControl. When creating a new project all parameters must be checked and, if necessary, adapted.

The following parameters must be set as a minimum:

- *PIN1 LogicType* (PNP or NPN): for all sensors connected to the SegmentControl and ComControl
- *PIN2 SwitchType* (normally closed / normally open): for all sensors connected to the SegmentControl and ComControl
- *PIN4 Function*: for all ComControls it must be selected to which input (In1, In2 or In3) the zone sensor is connected

The parameters are saved in the Configurator on saving the project. Parameter sets with which a conveyor works well should be saved for possible later changes as the parameters cannot be read by at the modules following downloading to the latter.



The parameters only become effective once they have been transferred to the modules (see "*Downloading parameters*", page 57).

The *Reset Parameters* button only effects the previously selected modules.

Planning

Overview of parameters

Below the setting options of the individual parameters are shown in the order of the tabs.

A detailed explanation of the parameters is given in the appendix (see "Glossary of parameters", page 82).

Zone

This tab includes the information on the numbering of the previous and subsequent zone, the release mode selection, the setting of all time parameters, the setting of error reactions and the selection of the number of a SegmentControl to which a second RollerDrive (Slave RollerDrive) can be connected.

ID	Name	Meaning	Value range	Default setting
PZ2	<i>UpStreamAdr</i>	Address of the upstream zone	Cannot be set	–
PZ3	<i>DownStreamAdr</i>	Address of the downstream zone	Cannot be set	–
PZ4	<i>AdrSlaveRD</i>	Address of the zone of the assigned Slave RollerDrive	<i>No Slave RD</i>	<i>No Slave RD</i>
PZ5	<i>ReleaseMode</i>	Release mode	<i>Single release</i> <i>Train release</i>	<i>Single release</i>
PZ6	<i>TimeOut1</i>	Time from start of the RollerDrive until the sensor becomes unblocked	1 – 15 s in 0.1 s increments 0 = no time-out	5
PZ7	<i>TimeOut1Reaction</i>	Reaction when TimeOut1 is exceeded	<i>Ignore error</i> <i>Zone stop + LED flashing</i>	<i>Zone stop + LED flashing</i>
PZ8	<i>TimeOut2</i>	Time from when the sensor in the upstream zone becomes unblocked until own sensor is blocked	1 – 15 s in 0.1 s increments 0 = no time-out	5
PZ9	<i>TimeOut2Reaction</i>	Reaction when TimeOut2 is exceeded	<i>Ignore error</i> <i>Zone stop + LED flashing</i> <i>Zone idle</i>	<i>Zone idle</i>
PZ10	<i>AfterRunTime</i>	Time from when the sensor becomes unblocked until the RollerDrive stops if there are no further packages	1 – 10 s in 0.1 s increments 0 = no after run	4
PZ11	<i>PermissionDelay</i>	Time between the following statuses: <ul style="list-style-type: none"> Sensor blocked, zone in status blocked (package standing). Change to unblocked status (sensor unblocked) following removal of the package Sensor unblocked, "unblocked" message to upstream zone 	1 – 10 s in 0.1 s increments 0 = no after run	2

Planning

ID	Name	Meaning	Value range	Default setting
PZ12	<i>TrainReleaseDelay</i>	Delay in train release	0.1 – 2 s in 0.1 s increments 0 = no delay	0.2
PZ13	<i>SensorDelay</i>	Delay in sensor signal (If the zone has to convey in both directions, the sensor is positioned in the middle of the zone and the RollerDrive has to run on for a specified time to allow the package to be transported to the end of the conveyor zone.	0.1 – 2 s in 0.1 s increments 0 = no delay	0
PZ14	<i>GlobalInitTime</i>	Time period for global initialization	1 – 10 s in 0.1 s increments 0 = no initialization	4
PZ15	<i>LocalInitTime</i>	Time period for local initialization	1 – 10 s in 0.1 s increments 0 = no initialization	4
PZ16	<i>RDErrorMode</i>	Reaction in the event of a RollerDrive error	<i>Ignore error</i> <i>LED flashing</i> (RollerDrive is still controlled) <i>Zone stop + LED flashing</i>	<i>Zone stop + LED flashing</i>
PZ17	<i>RDErrorRecovery</i>	Action after recovering a RollerDrive error	<i>No Init</i> <i>Local Init</i>	<i>Local Init</i>
PZ18	<i>SensorErrorMode</i>	Reaction in the event of sensor low gain	<i>Ignore error</i> <i>LED flashing</i> <i>Zone stop + LED flashing</i>	<i>Zone stop + LED flashing</i>
PZ19	<i>SensorErrorRecovery</i>	Action after recovering sensor low gain	<i>No Init</i> <i>Local Init</i>	<i>No Init</i>
PZ20	<i>TemperatureRecovery</i>	Action when the switch-on temperature is reached after the switch-off temperature has been exceeded	<i>No Init</i> <i>Local Init</i> <i>Power reset required</i>	<i>Power reset required</i>
PZ21	<i>PowerErrorMode</i>	Reaction in the event that the power supply voltage is too low or too high	<i>Ignore error</i> <i>LED flashing</i> <i>System error</i>	<i>System error</i>

Planning

RollerDrive, Slave RollerDrive

This tab includes all the parameters for the functions of the RollerDrive. Since parametrization of the gear ratio, diameter and conveying speed effects the actual speed of the RollerDrive, plausibility is checked.

Every SegmentControl or ComControl can handle a RollerDrive and an additional Slave RollerDrive. The Slave RollerDrive data can be set separately from the main RollerDrive.

ID	Name	Meaning	Value range	Default setting
PD1	<i>GearRatio</i>	Gear ratio	<ul style="list-style-type: none"> • 9:1 • 12:1 • 16:1 • 20:1 • 24:1 • 36:1 • 48:1 • 64:1 • 96:1 	12:1
PD2	<i>RDDiameter</i>	Effective drive diameter (enter the mean diameter for conical RollerDrive)	50 – 80 mm (no decimal points)	50
PD3	<i>RDDirection</i>	Direction of rotation on cable side	<i>Clockwise</i> <i>Counterclockwise</i>	<i>Clockwise</i>
PD4	<i>MainSpeed</i>	Speed of the RollerDrive	0.01 m/s – 1.75 m/s (max. 2 decimal places)	1.3
PD5	<i>AlternativeSpeed</i>	Alternative conveying speed (can be controlled via a digital input)	0.01 m/s – 1.75 m/s (max. 2 decimal places)	1.3
PD6	<i>RDAcceleration</i>	Acceleration	0 – 10.00 m/s ² (max. 2 decimal places)* 0 = no influence	0
PD7	<i>RDDeceleration</i>	Deceleration	0 – 10.00 m/s ² (max. 2 decimal places)* 0 = no influence	0

* The values which can be set are guidelines. Actual acceleration or deceleration results from the RollerDrive and the value set. In principle, the RollerDrive accelerates and decelerates as fast as possible. This can only be reduced with the setting.

Planning

Sensor

This tab includes the parameters for the sensors on the SegmentControl. The function is restricted to the connection of a zone sensor.



A SegmentControl can control two zones. Each zone can be parameterized separately. When setting the parameters, it must be noted whether just one or both zones of a SegmentControl were selected. The set parameters only apply to the selected zone(s).

ID	Name	Meaning	Value range	Default setting
PIN1	<i>LogicType</i>	Output type	NPN PNP	PNP
PIN2	<i>SwitchType</i>	Switch type	<i>Normally open</i> <i>Normally closed</i>	<i>Normally open</i>
PIN3	<i>LowgainInput</i>	Low gain input	<i>Without</i> <i>With</i>	<i>Without</i>

Module

The parameters of the Modules tab must not be set, the parameters can merely be read out.

ID	Name	Meaning	Value range	Default setting
	<i>NodeID</i>	Numbering	Cannot be set	–
	<i>ProductKey</i>	Article number of the module *	Cannot be set	–
	<i>Serial</i>	Serial number of the module *	Cannot be set	–

* only displayed after addressing

Planning

In 1, In 2 and In 3

This tab includes the parameters for the inputs of the ComControl. A zone sensor must be connected to one of the inputs of the ComControl. The parameter DigitalInputFunction must be set to the value "Zone Sensor" for the relevant input. The tabs are assigned to the connections of the ComControl as follows:

Tab	Connection labeling ComControl
<i>In 1</i>	Zone Sensor
<i>In 2</i>	Add. Sensor
<i>In 3</i>	In/Out (terminal box)

ID	Name	Meaning	Value range	Default setting
PIN1	<i>LogicType</i>	Output type	NPN PNP	PNP
PIN2	<i>SwitchType</i>	Switch type	<i>Normally open</i> <i>Normally closed</i>	<i>Normally open</i>
PIN3	<i>LowgainInput</i>	Low gain input (without in case of <i>In 3</i>)	<i>Without</i> <i>With</i>	<i>Without</i>
PIN4	<i>Function</i>	Function assignment sensor input* (not available for SegmentControl, function = zone sensor)	<i>Not used</i> <i>Zone sensor</i> <i>Start sensor</i> <i>Start D one zone</i> <i>Start Z one zone</i> <i>Stop D one zone</i> <i>Stop D all zones</i> <i>Stop Z one zone</i> <i>Stop Z all zones</i> <i>Clear</i> <i>Clear reverse</i> <i>Alternative speed</i> <i>Conveyor direction</i>	<i>Not used</i>

* Only one input may be parametrized to the function *Zone Sensor*. The function *Start Sensor* may only be connected to one input of the ComControl which controls the first zone of a conveyor. If functions (e. g., *Stop D all zones*) are defined at several inputs, these are linked with **OR**.

Planning

Out 1, Out 2 and Relay

This tab includes the parameters for the outputs of the ComControl in the terminal box.

ID	Name	Meaning	Value range	Default setting
POUT1	<i>LogicType</i> (only with <i>Out 1</i> and <i>Out 2</i>)	Output type	PNP (cannot be set)	PNP
POUT2	<i>SwitchType</i>	Switch type	<i>Normally open</i> <i>Normally closed</i>	Normally open
POUT3	<i>Function</i>	Function assignment	<i>Not used</i> <i>Error signal</i> <i>Aux RD start*</i> <i>Zone status</i> <i>Sensor signal</i> <i>Input signal 2</i> <i>Input signal 3</i>	<i>Not used</i>
POUT4	<i>SignalDelay</i>	Signal delay	1 – 10 s in 0.1 s increments 0 = no delay	0

* Output is switched parallel to RollerDrive.

CentralControl

The CentralControl must not be parameterized, the parameters can merely be read out.

ID	Name	Meaning	Value range	Default setting
PG1	<i>ControlMode</i>	Central or decentralized conveyor control	Cannot be set	Decentralized
	<i>NodeID</i>	Numbering	Cannot be set	–
	<i>ProductKey</i>	Article number of the module	Cannot be set	–
	<i>Serial</i>	Serial number of the module	Cannot be set	–

Assembly

Warning information for assembly

NOTICE

Risk of damage leading to failure or shortened life expectancy

- Check each ConveyorControl module visually for damage before assembly.
- Make sure that these modules are not warped during installation (no bending or torsion).
- Do not drill additional mounting holes in the casing or enlarge the holes provided.
- Do not drop the modules to prevent internal damage.

Assembly of ConveyorControl modules

Initial assembly

The ConveyorControl modules are attached to the conveyor frame with 2 screws (diameter 4 mm, not included with delivery). There are 3 mounting holes at each module attachment point. The left-hand holes should be used for initial assembly.



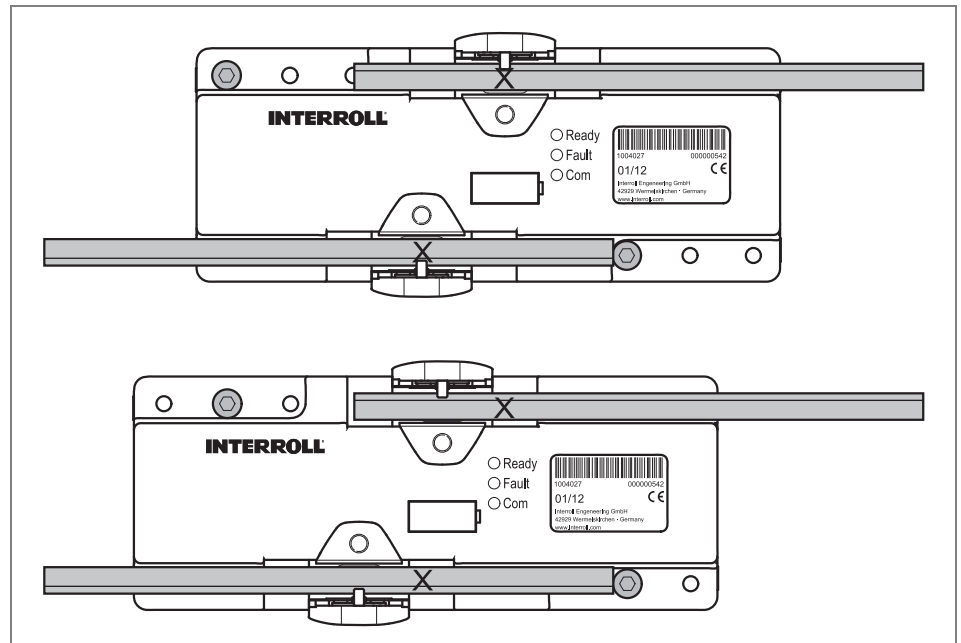
To simplify electrical installation, if possible all modules should be assembled on the same side of the conveyor. In the case of curves, wherever possible the modules should be assembled on the outside radius as the RollerDrive connection is on this side.

- Identify a flat area on the conveyor system frame upon which the modules are to be assembled. Ensure that there is approx. 40 mm space to the left of the designated area in order to be able to move the module at a later date if necessary.
- Use the module as a template and mark the center of the left mounting holes. For the distance between the holes, see *"Dimensions", page 17*.
- Drill two holes with a diameter of 4.5 mm on the markings in the conveyor system frame.
- Bolt the module to the frame.
- Ensure that the housing is not distorted.

Assembly

Repeated assembly

If an already connected flat cable had to be removed from a module, the flat cable must not be pierced at the same point as otherwise a proper contact cannot be ensured. To avoid the flat cable having to be removed and repositioned on all modules, in this case the ConveyorControl module can be attached via the central or right-hand mounting hole. Consequently, the position of the module to the flat cable changes and the flat cable can be pierced at a different point. The insulation is self-healing which means protection rating IP54 is achieved.



In the above picture, the module is attached via the left mounting hole, in the below picture via the central mounting hole. The point at which the flat cable was connected is marked with X.

Warning information relating to the electrical installation

NOTICE

Damage to ConveyorControl modules

➤ Observe the following safety information.

- Electrical work should only be performed by qualified and authorized persons. Protection rating IP54 is only achieved with correct installation.
- Disconnect the power supply before installing, removing or rewiring the ConveyorControl modules.
- Ensure that no hazardous voltage can come into contact with the connections or the housing, not even in the event of a malfunction or fault.
- ConveyorControl modules are never to be operated with AC current as this will cause irreparable damage.
- Do not use earth connections or earth wires as a protective conductor (PE).
- Do not apply too much tension or load to the plug. The cable insulation can become damaged if the cable is bent at the plug and the ConveyorControl modules or the RollerDrive could fail.
- Only use cables that are dimensioned sufficiently for the application.
- Ensure that the switching power supply unit supplying the ConveyorControl system supplies a nominal DC voltage of 24 V with a maximum deviation of $\pm 8\%$.
- Ensure that the RollerDrive and the voltage source are connected to the conveyor frame or supporting structure in such a way that they are properly earthed. Incorrect earthing can result in the build-up of static charge, causing the RollerDrive or the ConveyorControl modules to malfunction or fail prematurely.
- Use suitable switching equipment to ensure safe operation.
- Only apply operating voltage when all of the cables have been connected.

NOTICE

Damage to the flat cable following incorrect wiring

- Do not bend the flat cable on the narrow side.
- When bending on the broad side ensure a minimum bending radius of 12 mm (when in a fixed installation) or 30 mm (at moving points and during storage and transportation).
- When laying and when in a fixed installation ensure that the flat cable is not subject to tensile stress.
- Avoid excessive vibrations, unsupported free-hanging cable, bending and crushing.

Assembly

Electrical installation

Laying of the flat cables

- Do not bundle the flat cable with other control cables or high-voltage lines. Laying system C or E as per DIN VDE 0298-4 is favored.
- Ensure that the bus line is not longer than a total of 200 m (including all branches).
- Do not connect any more branches to a line which branches off from the main line. Branches may only lead off from the main line.
- Cut off any residual length on the line ends; do not roll up.

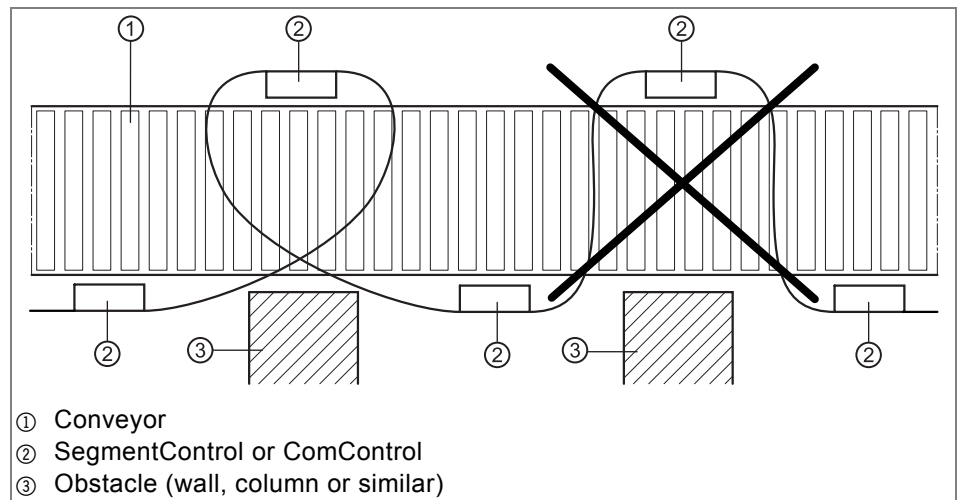
Changing the side of assembly

The laying of lines is simplest when all modules in the conveyor are assembled on the same side. This, however, is not always possible, e.g., due to structural obstacles (walls, pillars, etc.). Even if there are several curves in the route, it can be recommended to change the assembly side as the connection of the RollerDrive is always on the outside radius of the curve.

When changing the assembly side, the bus line coding must be observed, as such there are three options when changing:

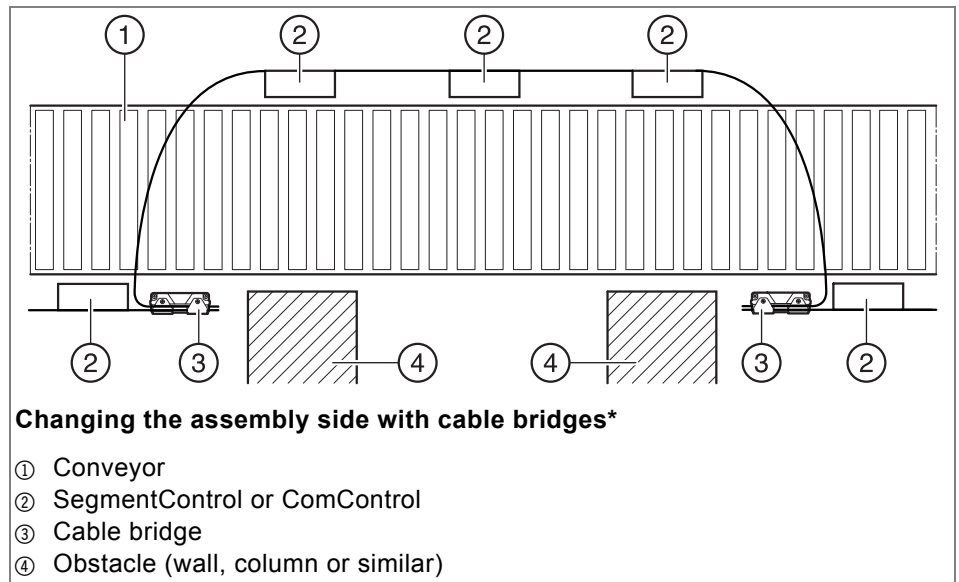
- Lay the main line in a loop on the other side.
- Lay the main line with a cable bridge on the other side.
- Branch off a line for the other side.

If a single module has to be repositioned to the other side, it makes sense to lay the main line in a loop on the other side. The line must not be laid directly as otherwise the polarity of bus communication would be reversed.



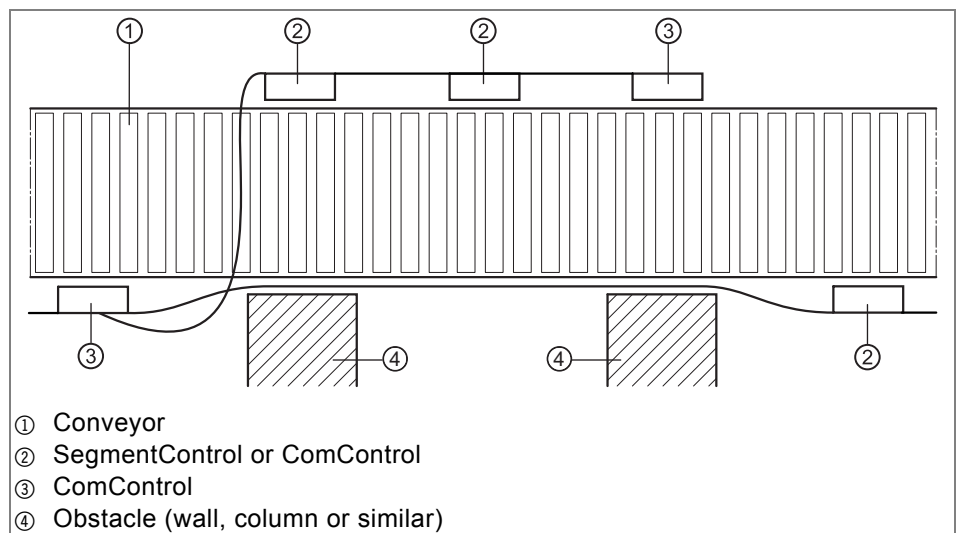
Assembly

If several modules have to be repositioned to the other side, a loop has to be laid for each module. To keep the line as short as possible, in this case a cable bridge can also be used. With the aid of the cable bridge, the bus line coding can be adapted.



* The line to the power supply can be laid in the same way.

Alternatively one or several modules on the other side can also be connected with a branched off line (connection 'Data A1' or 'Data A2'). In this case, however, a ComControl has to be used with branching and at the end of each branched off line.



Assembly

Overview of connections

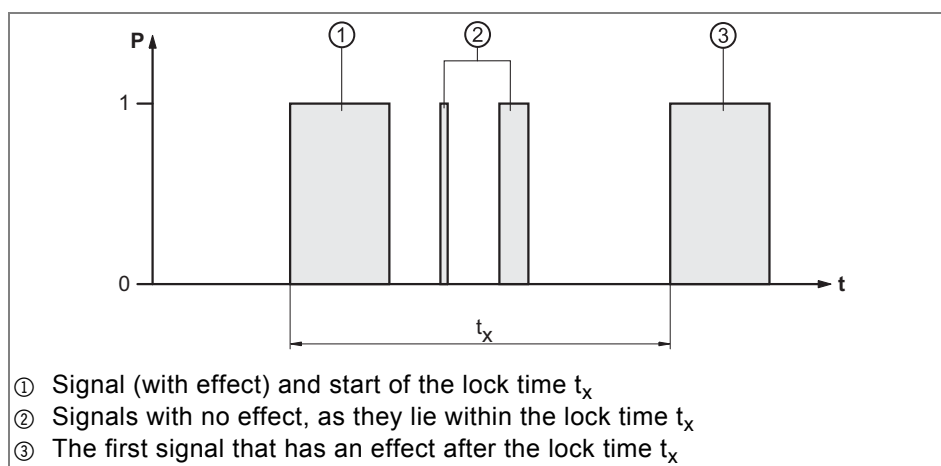
The ConveyorControl modules have the following connections:

Module	Connection	Signal/components	Contacting	Type
All	Power	Power supply	Flat cable via pin	IN
All	Data	Bus communication	Flat cable via pin	IN/OUT
CentralControl	USB	USB 2.0	USB Mini-B, 5-pin	IN/OUT
SegmentControl	RD left, RD right	RollerDrive	5-pin M8, snap in (suitable for EC310)	OUT
SegmentControl	Sensor left, Sensor right	Zone sensor	4-pin, socket M8	IN
ComControl	Data A1	Bus branch left	Flat cable via pin	IN/OUT
ComControl	Data A2	Bus branch right	Flat cable via pin	IN/OUT
ComControl	RD	RollerDrive	5-pin M8, snap in (suitable for EC310)	OUT
ComControl	Zone Sensor	Input In 1	4-pin, socket M8	IN
ComControl	Add. Sensor	Input In 2	4-pin, socket M8	IN
ComControl	In/Out (Terminal box)	Input In 3	Spring terminals	IN
		Outputs Out 1, Out 2	Spring terminals	OUT
		Relay: electrically isolated relay contact	Spring terminals	OUT

The electrical parameters of the connections are specified in the appendix (see page 89).

Lock time with bouncing level

To ensure functionality with a bouncing level, all signal inputs (In 1, In 2 and In 3) are protected by firmware. This means that after a signal status change, there is a lock time of 60 ms in which no additional status change is processed.



Assembly

Power supply and bus communication

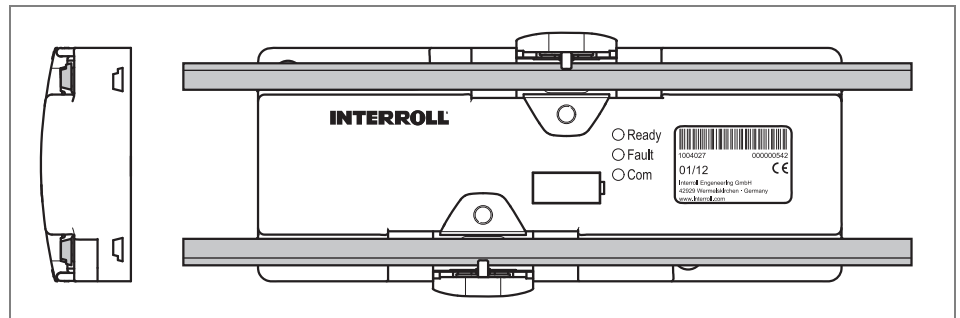
A flat cable is used for both the power supply and bus communication, these cables are fixed to the ConveyorControl modules using yellow tabs. Closing the tabs pierces the cables.



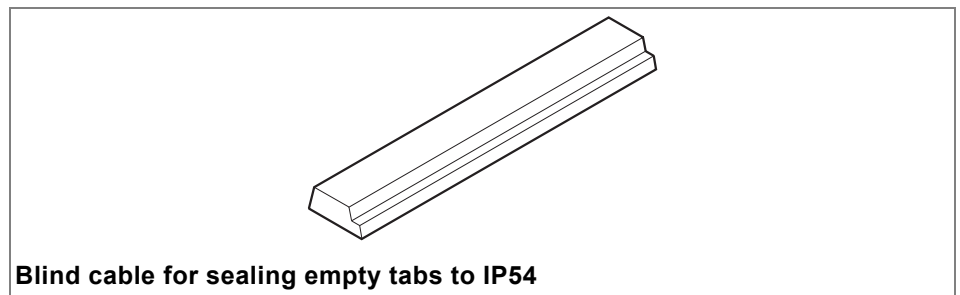
If several PowerControl power supply units are used, the ground connections must be connected to a common ground.

A PZ1 screwdriver is required for the screws of the tabs (Power and Data connections) and the lid of the terminal box (see *"Inputs and outputs ComControl"*, page 50).

- Ensure that all the necessary ConveyorControl modules are assembled onto the conveyor.
- Release the screws on the tabs and open the tabs.
- Ensure that the flat cables for the power supply and for bus communication are not mixed up:
 - Power supply: Flat cable 2 x 2.5 mm², black
 - Bus communication: Flat cable 2 x 1.5 mm², yellow
- Lay the flat cable in the right direction (see graphic) without applying any load or tension, if necessary take appropriate measures to reduce tension and vibration. The tabs are positive-locking. As such, the flat cable can only be laid in one direction and polarity cannot be reversed.



- Note the orientation label on the side of the modules.
- Place the flat cable straight on the ConveyorControl modules.
- Press the flat cable onto the pin under the tab.
Close the tab and tighten the screw to max. 1.0 Nm.
- In the case of the ComControl first bond the 'Data A1' or 'Data A2' connection with side stream or blind cables in order to achieve protection rating IP54, then bond the 'Data' connection. To improve cabling, press the Data flat cable into the recesses on the 'Data A1' and 'Data A2' tabs.



Assembly



In the case of the ComControl the main bus communication line must always be connected to 'Data'. Only one side stream may be connected to the 'Data A1' and 'Data A2' connections.

Only one side stream is permitted per ComControl. Thus a maximum of one of the 'Data A1' and 'Data A2' connections may ever be used. Depending on the desired position of the flat cable, either Data A1 or Data 2 is to be selected.

- Activate the terminating resistor (dip switch in the terminal box) on the ComControl at which the bus communication line ends.
- If a flat cable ends at a module, secure a suitable end cap to the end of the flat cable in order to achieve protection rating IP54.



If an tab had to be opened after bonding, the flat cable must not be reconnected at the same point as otherwise a proper contact cannot be ensured. In this case, the module must be repositioned (see *"Repeated assembly", page 42*).

RollerDrive

The connections 'RD left' and 'RD right' (on the SegmentControl) or 'RD' (on the ComControl) are prepared for the RollerDrive EC310. The RollerDrive EC310 connection cable is already fitted with a suitable plug.

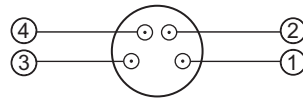
- Insert the plug so that the module name (ComControl or SegmentControl) can be read and that the labeling *EC310* on the plug is to the rear, i.e. cannot be read.
- Upon connecting a RollerDrive to a SegmentControl note the position of the RollerDrive: Always connect the left zone RollerDrive to 'RD left' and the right zone RollerDrive to 'RD right'. If only one zone is to be controlled, the RollerDrive must be connected to 'RD left'.
- If two RollerDrive are to be connected in a zone, use a SegmentControl and connect the Master RollerDrive to 'RD left' and the Slave RollerDrive to 'RD right'.
- If a RollerDrive connection remains unused, seal this with a M8 blind cap to achieve protection rating IP54.

Assembly

Sensors

The inputs 'Sensor left' and 'Sensor right' (on the SegmentControl) or 'Zone Sensor' and 'Add. Sensor' (on the ComControl) are identical in terms of design.

The sensor inputs on the SegmentControl are designed for the zone sensors of up to two zones. The sensor inputs on the ComControl can also be parameterized and used as a signal input for various functions as an alternative to a zone sensor, e.g., to connect a start sensor.



Sensor connection

- ① Operating voltage sensor (identical to the operating voltage of the SegmentControl or ComControl on the 'Power' connection)
- ② Error signal sensor (can be parameterized)
- ③ Ground connection sensor (identical to the ground connection of the SegmentControl or ComControl on the 'Power' connection)
- ④ Switching input sensor (can be parameterized)

NOTICE

Pin 1 is not short-circuit protected

In the event of a short-circuit, the protection fuse is triggered and the SegmentControl or ComControl is thus destroyed

- Subject Pin 1 to a max. load of 100 mA.
- Do not feed in voltage via Pin 1 and 3.

NOTICE

Pin 3 is electrically connected to the ground connection of the operating voltage

Pin 3 does not have a protective earth function (PE)

- Do not use Pin 3 as a protective earth.



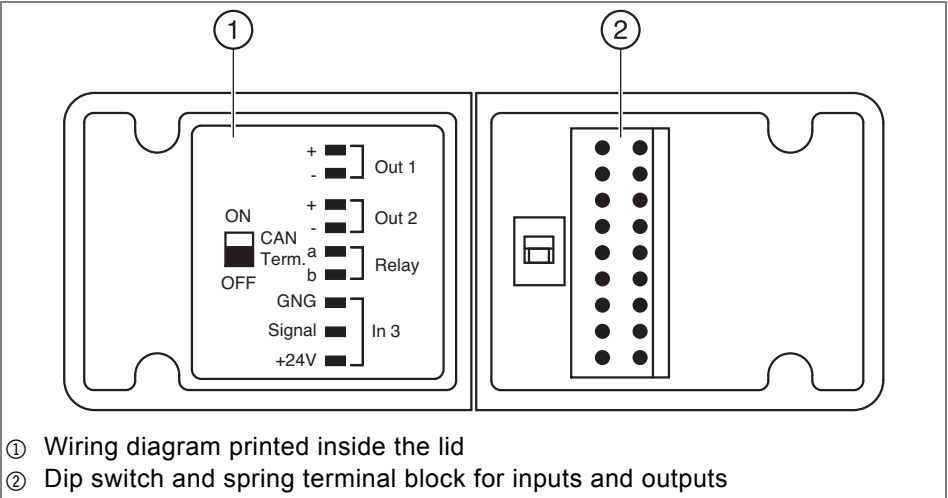
At Pin 2 and 4 evaluation of the switching signal (PNP, NPN level) or the sensor switching function (normally open / normally closed) can be parameterized as desired to allow various sensors to be connected.

- Upon connecting a zone sensor to a SegmentControl note the position of the zone: Always connect the zone sensor in the left zone to 'Sensor left' and the zone sensor in the right zone to 'Sensor right'. If only one zone is to be controlled, the zone sensor must be connected to 'Sensor left'.
- If a sensor connection remains unused, seal this with a M8 blind cap to achieve protection rating IP54.

Assembly

Inputs and outputs ComControl

In the terminal box of the ComControl, there is the option of connecting further inputs and outputs. The dip switch for turning the terminating resistor for the bus line on and off is also located here.



Connection	Description
Out 1 and Out 2	<p>Digital output. The use of the signal (e. g., as error output) and the switching function (normally open or normally closed) can be parameterized.</p> <p>Both outputs are directly connected to +24 V DC and ground without a fuse. In the event of an overload, the current is automatically limited which, depending on the current, ambient temperature and duration of the overload, results in a thermal cut-off. Once the overload has been reduced, the output automatically switches on again (the ComControl must have cooled down by approx. 15 K in relation to the temperature at the time of switching off). This overload protection does not offer line and load protection; it serves exclusively to protect the switching level.</p> <p>Note:</p> <ul style="list-style-type: none">• When the switch is set to OFF, the terminals are not electrically isolated from the operating voltage!• The outputs Out 1 and Out 2 must not be interlinked.• Power must not be fed in at Out 1 and Out 2.
Relay	Electrically isolated relay contact
In 3	Digital input signal. Evaluation of the signal (NPN or PNP) and the switching function (normally open or normally closed) can be parameterized. The purpose of the signal can also be parameterized, e.g, as a start sensor.

All the connections in the terminal box are spring terminals for installation without tools. The following conductors can be connected:

- Braid wire 0.2 ... 1.5 mm², solid core or fine-wired without wire end sleeve
- Braid wire 0.25 ... 1.5 mm² with wire end sleeve (in the case of the wire end sleeve with collar max. 0.75 mm²)

Assembly



The wire gauge must be selected according to the highest possible load current. If loads are connected to the relay which are operated with more than safety extra-low voltage, the necessary insulation spacing must be ensured.

The grommet (TPE) is specified for maximum 3 round cables Ø 4.5 ... 6 mm. To simplify attachment and creation of the holes, it can be removed from the housing.

- Strip 8 mm off the cables.
- Guide the cables through the grommet and connect to the spring terminals. For simpler operation, the white button can be depressed using a slot screwdriver (blade width approx. 3 mm) and, in doing so, the terminal can be enabled.
- Ensure that the round cables used fit snugly in the cable passages.
- Close the lid of the terminal box so that it is flush with the housing and tighten both screws to 0.8 Nm.



- Operation of the ComControl with an open terminal box lid or without grommet is not permitted!
- The grommet is not a cable relief. In accordance with the concrete operating conditions of the specific conveyor, the cable/line types used and the electric operating voltages of the connected components are required for safe operation and/or additional module installation support.

USB connection CentralControl

The CentralControl features a USB mini B connection in order to connect it to a laptop and to transfer the ConveyorControl Configurator data.

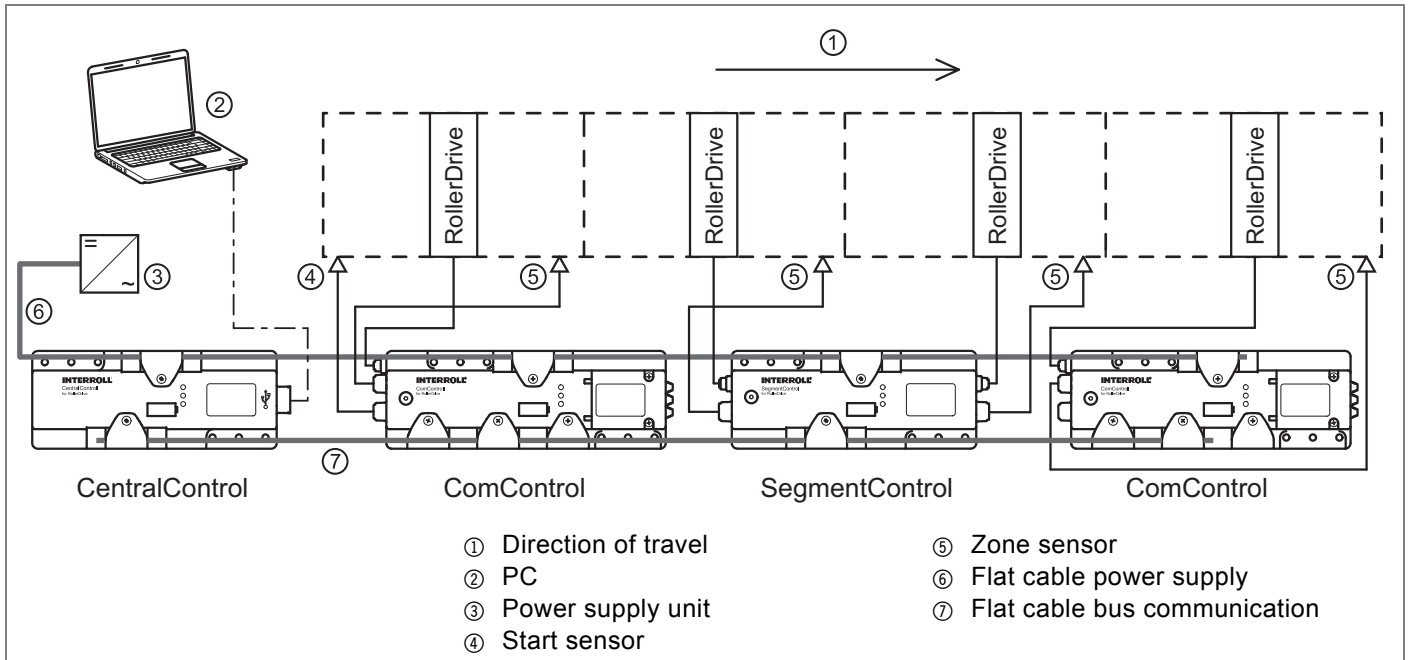
- Pull off the protective black cap. Do not tear the mechanism against loss.
- Connect the USB plug.
- When the USB connection is no longer required, remove the USB cable and reattach the protective cap to achieve protection rating IP54.

Ensuring protection rating IP54

Depending on the use and thus the wiring of the ConveyorControl modules connection options may remain open. To ensure protection rating IP54, these connections must be sealed with protective caps.

- Screw on M8 blind caps onto all unused sensor connections and RollerDrive connections.
- If a flat cable ends at a module, secure a suitable end cap to the end of the flat cable.
- If on the ComControl the connections 'Data A1' or 'Data A2' are not used, use the blind cable parts enclosed to achieve protection rating IP54.
- Close the lid of the terminal box of the ComControl so that it is flush with the housing and tighten both screws to 0.8 Nm. Ensure that the round cables used fit snugly in the cable passages.
- Ensure that the USB protective cap is attached properly on the CentralControl.

Example of connection



An example of minimal wiring of the ConveyorControl for a conveyor with four zones is shown. The example includes a CentralControl, two ComControls and a SegmentControl as well as a power supply unit, a PC for addressing and parameterizing, a start sensor and a zone sensor and RollerDrive per zone.

The SegmentControl controls and monitors two zones. The first ComControl assesses the signal from a start sensor and controls a zone. The second ComControl controls a zone and provides the terminating resistance for bus communication. The modules are connected to each other via the flat cables for the power supply and for bus communication. All the modules, sensors and RollerDrive are supplied with operating voltage by the power supply unit.

The PC only has to be connected to the CentralControl during addressing and parameterizing. During normal operation, connection of a PC is not necessary.

Initial startup and operation

Initial startup

Checks before initial startup

- Ensure that all ConveyorControl modules have been correctly fastened to the profile and that all screws have been correctly tightened.
- Ensure that there are no additional areas of danger caused by interfaces to other components.
- Ensure that the wiring is in accordance with the specification and legal directives.
- Check all protection devices.
- Ensure there are no bystanders in dangerous areas around the conveyor.

Pre-commissioning checks

- Check all ConveyorControl modules for visible damage.
- Check all protection devices.
- Ensure that no RollerDrive is blocked.
- Clearly specify and monitor the way goods are placed on the conveyor.
- Ensure there are no bystanders in dangerous areas around the conveyor.

Addressing modules

Each module must be given an unambiguous address before the conveyor can be put into operation. The order of addressing was already planned in the step *Prepare to Address* (see "*Preparing to Address*", page 30). On the basis of this planning, each SegmentControl and ComControl must now be assigned an address with the aid of the addressing magnet.

Prerequisites:

- All route in the conveyor were defined and concluded in the step *Prepare to Address*.
- An addressing magnet is available.

NOTICE

Damage due to magnetism

Devices which are sensitive to magnets can be damaged and data may be deleted.

- Do not place the addressing magnet close to devices which are sensitive to magnets or sensitive data carriers (e. g., bank cards).

- Using the USB cable connect the computer with the CentralControl or GatewayControl.

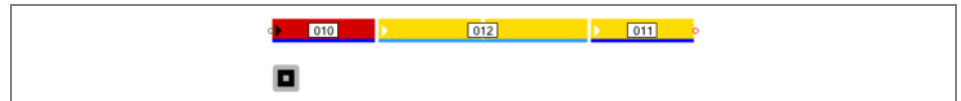
The Configurator connection status is shown at the bottom left.



- In the work step bar, click on the *Address* button.
If there is no connection to the CentralControl or GatewayControl an error message to this effect is shown.

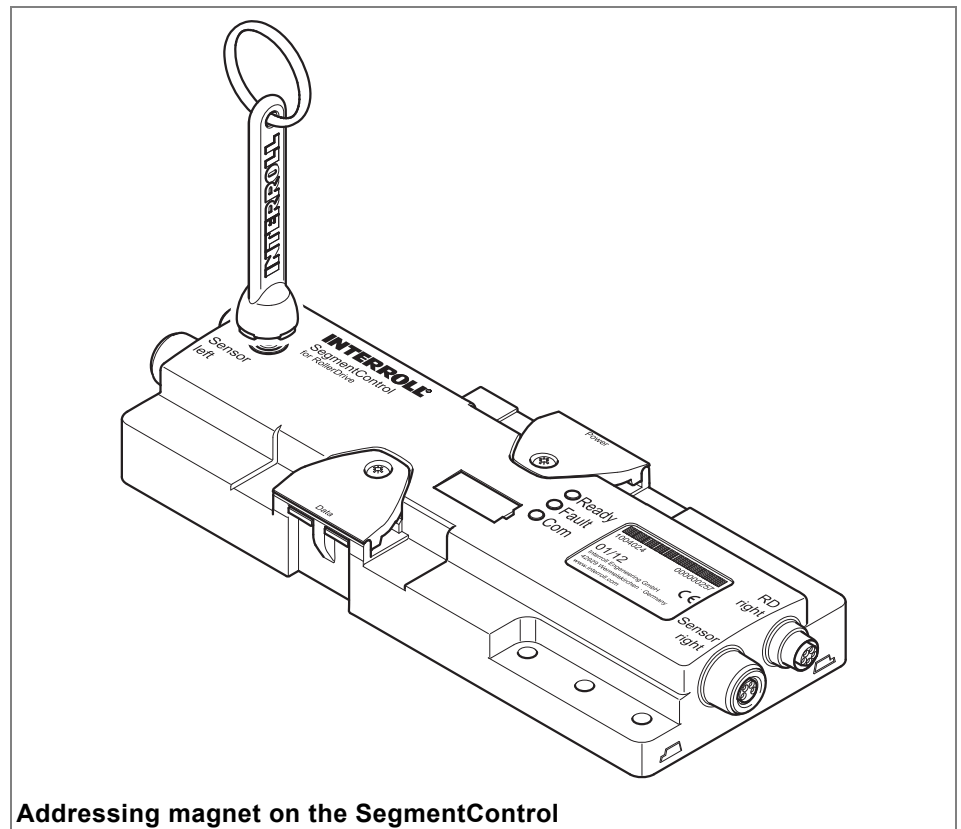
Initial startup and operation

- Mark the routes in the route list which are to be addressed.
The route is highlighted yellow in the route list and on the work area.
- Click on the *Address route* button.
Whilst the modules are being prepared for addressing, a progress bar is shown. The first module to be addressed is then shown in red.
On the conveyor only the 'Com' LED is illuminated on modules which do not have a valid address, providing there are no errors.



Now the real modules (on the conveyor) must be assigned to the virtual modules (in the Configurator).

- To this end, hold the addressing magnet for at least 3 seconds (but no more than 10 seconds) against the contact point of the module which corresponds to the module marked red (position of the contact point see "*Structure*", page 14).



Addressing magnet on the SegmentControl



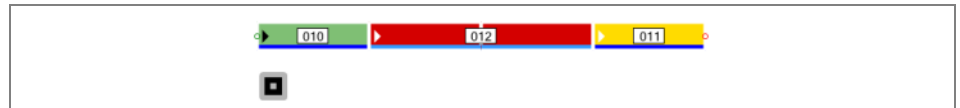
If the modules are assembled in a steel profile, it is possible that the contact point for the addressing magnet will not be in the position marked on the housing surface.

Initial startup and operation

If the addressing magnet is held correctly in front of the contact point, in addition to the 'Com' LED the 'Fault-' LED also lights up. After one second the 'Com' LED flashes, after 3 seconds, the 'Com' and 'Fault'-LEDs flash. This means that the module now has a temporary address and the addressing magnet can be removed. If the addressing magnet is removed, all three LEDs flash synchronously.

In the Configurator the addressed module is highlighted green and the next module to be addressed is highlighted red.

When the addressing magnet is removed, all three LEDs flash at the same time, if this is not the case, module addressing has not been successful.



A progress bar below the route list shows the ratio of addressed to non-addressed modules.

- Address all other conveyors in the same manner.
- If module addressing is not successful, this can be repeated as often as required, it may be necessary to check bus communication. To repeat addressing:
- End addressing in the Configurator using the button *Close*.
- Reset power.
- Start addressing again.
 - To reset an addressing during addressing, end the procedure in the same way and start addressing again.
- If addressing is to be ended prematurely, click on the *Close* button.
 - In this case, all temporary addresses are deleted.
 - Once all modules in a conveyor line have been addressed, and the progress bar is complete, all the modules in this conveyor line are permanently addressed. The addresses remain saved even in the event of power failure.
- If an address is to be deleted on conclusion of addressing, hold the addressing magnet for longer than 10 seconds in front of the contact point of the relevant module.

Successful addressing is displayed as follows:

- The LEDs 'Ready' and 'Com' on the modules are constantly illuminated and the LED 'Fault' displays a system error as no parameter data is available.
- A green dot appears behind the name of the route in the route list in the Configurator. The route in the work area appears green once it is no longer selected.



If the power fails during addressing or the USB connection is interrupted, addressing must begin again as the addresses cannot be saved permanently until the entire route has been addressed.

If there are several routes in a conveyor, each route must be individually addressed as described above.

Initial startup and operation

Addressing a replacement module

If an already addressed route is to be addressed a second time, the addresses are not overwritten. The Configurator checks the address of every module. Each module is displayed in green when a valid address is available. The modules are displayed in green step by step. If a module does not have a valid address, the procedure on this module is stopped and the module can be addressed as described above.

If a module is damaged, it has to be replaced.

- Install a new module. Ensure that the flat cable contact is not in the same place as before (see *"Repeated assembly"*, page 42).
- Switch on the power supply.
- If the module is not brand new, hold the addressing magnet for more than 10 seconds in front of the contact point in order to delete any other addressing.
- Start addressing as described above.
The replaced module is shown in red in the Configurator, all modules in the prior conveying direction are shown in green.
- Hold the addressing magnet for at least 3 seconds and not more than 10 seconds in front of the contact point of the new module in order to address it.
- If necessary, address replaced modules in the same way.

Initial startup and operation

Downloading parameters

The parameters which were set in the step *Parameterize* (see "*Parameterizing modules*", page 32), must be downloaded to the conveyor in order to become effective.

Prerequisites:

- All modules are addressed.
- All parameters are set in the Configurator.
- The computer is connected to the CentralControl or GatewayControl via the USB line.



CAUTION

Collisions with external systems during parameter downloading

- Whilst downloading the parameters no packages should be transported because output signals may not be processed correctly.

- In the work step bar, click on the *Download* button.

All parameters are downloaded. Depending on the number of modules, this may take a few moments. A progress bar shows the status of the download process.

If parameter downloading is started whilst the conveyor is operating, conveying is stopped before the parameters are downloaded.

Following downloading of the parameters, the conveyor performs global initialization automatically (see "*Initialization*", page 11) and then starts conveying as per the parameters set. The computer can now be disconnected from the CentralControl or GatewayControl.



The conveyor can only be stopped by a stop signal (e. g., via one of the ComControl inputs) or by switching off the power supply.

If the parameters cannot be downloaded and saved in the modules, downloading is ended and the 'Fault'-LED shows a system error.

- Check bus communication in the case of a system error.
- Reset the system error by resetting the power.

If the power fails whilst the parameters are being downloaded, the USB line is interrupted or the *Close* button is clicked, downloading is ended and an error message appears. The error message must be confirmed before the power to the conveyor can be switched on again. There is no conveying or initialization for the duration of the error message. If there were parameters in the modules prior to downloading, these will be reactivated following discontinuation and confirmation of the error message.



The Configurator project file with the set parameters should be saved and stored in order to simply make changes at a later date. The parameters cannot be read out of the modules again.

Initial startup and operation

- To delete all parameters in a module, hold the addressing magnet for more than 10 seconds in front of the module's contact point.
The module is thus reset to factory default. It therefore also loses its address and must be readdressed (see *"Addressing modules", page 53*) before parameters can be downloaded again.



If the modules are assembled in a steel profile, it is possible that the contact point for the addressing magnet will not be in the position marked on the housing surface.

Self-test

The self-test allows the following functions to be checked before the flat cable for bus communication is installed:

- Function and correct connection of the RollerDrive
- Function and correct connection of the zone sensors
- Function of and correct power supply to the respective module

During the self-test, the connected sensor and the RollerDrive are active. This means that depending on whether a sensor is blocked or not, the respective RollerDrive may or may not rotate. This interaction depends on the sensor's logic type (normally closed or normally open). The 'Fault'-LED is continuously lit up, the 'Ready' and 'Com' LEDs flash alternatively. The self-test takes 10 seconds.

The self-test on a ComControl can only be performed as above if this has been addressed and parameterized. If not addressed, the connected RollerDrive will only change status if the zone sensor has been connected to IN1 and its status changes.

NOTICE

Damage due to magnetism

Devices which are sensitive to magnets can be damaged and data may be deleted.

- Do not place the addressing magnet close to devices which are sensitive to magnets or sensitive data carriers (e. g., bank cards).

- To trigger the self-test, hold the addressing magnet for at least one second (but not longer than 3 seconds) in front of the module's contact point.

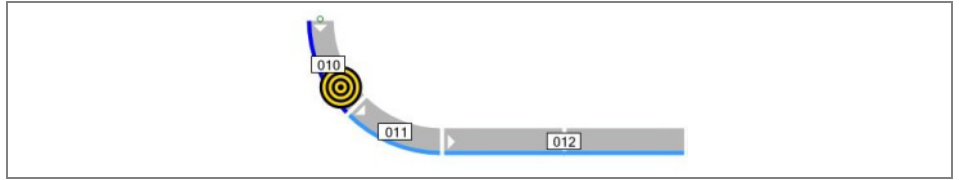


If the modules are assembled in a steel profile, it is possible that the contact point for the addressing magnet will not be in the position marked on the housing surface.

The self-test can also be triggered when the conveyor is operating. The prerequisite for this is that the zone sensor is not blocked when the self-test is triggered.

If the self-test is triggered whilst the conveyor is operating and the Configurator is connected with the CentralControl or GatewayControl, the module for which the self-test was started is circled in the Configurator (except in the *Download* step).

Initial startup and operation



The result of the self-test is displayed by the LEDs:

LED Ready	LED Fault	LED Com	Meaning
Flashes 1 Hz	On	Flashes 1 Hz	Self-test activated, 1 sensor connected, 1 sensor unblocked (depending on the sensor logic, this can also apply for a blocked sensor) - or - Self-test activated, 2 sensors connected, 2 sensors unblocked (depending on the sensor logic, this can also apply for blocked sensors)
On	On	Flashes 1 Hz	Self-test activated, 1 sensor connected, 1 sensor blocked (depending on the sensor logic, this can also apply for an unblocked sensor) - or - Self-test activated, 2 sensors connected, both sensors blocked (depending on the sensor logic, this can also apply for unblocked sensors)

LED 'Ready' with SegmentControl without address

If a SegmentControl has not been assigned an address, the 'Ready' LED flashes in the self-test if one or two RollerDrives are controlled. If both RollerDrives are not controlled, the 'Ready' LED is lit up.

If the SegmentControl has only been allocated to one zone, only the 'Ready' LED flashes as a second sensor is not connected and can thus not be blocked.

Initial startup and operation

Operation



CAUTION

Accidental start-up of the RollerDrive

Danger of crushing of limbs and damage to goods

- Ensure that no persons are in the conveyor's dangerous areas before switching on the power supply.



If no RollerDrives in the conveyor rotate, this does not necessarily mean that the conveyor is switched off.

Start

- Ensure that the operating conditions are complied with during operation (see *"Technical specifications", page 16*).
- Switch on the power supply.
Once all modules are parameterized, the conveyor is initialized (see *"Initialization", page 11*), conveying then commences.



If a conveyor is supplied by several power supply units, all power supply units must be switched on within a maximum of 10 seconds. If this time is exceeded, the CentralControl or GatewayControl displays a system error (see *"Error signaling", page 64*).


Stop

Conveying stops in the following cases:

- If the power supply is switched off.
- If a relevant signal is pending (see *"Possible wiring of the inputs", page 70*).
- If an error occurs.

Maintenance and cleaning

Warnings concerning maintenance and cleaning

	<p>CAUTION</p> <p>Risk of injury due to improper handling or accidental motor starts</p> <ul style="list-style-type: none"> ➤ Maintenance work and cleaning may only be executed by qualified and authorized persons. ➤ Only perform maintenance work after switching off the power. Ensure that the ConveyorControl system cannot be turned on accidentally. ➤ Set up signs indicating maintenance work.
---	--

Maintenance

Inspecting the ConveyorControl

The ConveyorControl modules themselves are maintenance-free. For avoidance of faults however, regular inspection of the connections and fixings is recommended.

- As part of the regular control and maintenance work on the conveyor, ensure that the screws of all ConveyorControl modules are still tight and that the cables are still laid properly and connected to the terminals.


Replacing ConveyorControl modules

If a ConveyorControl module is damaged, it has to be replaced.

- Install a new module (see *"Shut-down"*, page 68 and see *"Assembly of ConveyorControl modules"*, page 41).
- Address (see *"Addressing a replacement module"*, page 56), parameterize and download the parameters to the new module (see *"Downloading parameters"*, page 57).

Cleaning

Dust and dirt in combination with humidity may bridge the electric circuit. Therefore, in a dirty environment, periodic cleaning will help to avoid short-circuits which could damage the ConveyorControl modules.

	<p>CAUTION</p> <p>Risk of damage to the ConveyorControl system modules due to incorrect cleaning</p> <ul style="list-style-type: none"> ➤ Do not immerse the ConveyorControl system modules in liquids. ➤ Do not use cleaning agents.
---	---

- Clean away dust and soiling if necessary.
- For more thorough cleaning, disconnect the ConveyorControl system from the power supply, remove the modules (see *"Shut-down"*, page 68), and wipe over with a damp cloth.

Troubleshooting

Meaning of the LEDs

The LEDs provide information on the operating state of the ConveyorControl system.

Each module has 3 LEDs:

- Ready (green)
- Fault (red)
- Com (green)



In the case of several faults, only the first fault which occurred is shown.

CentralControl

LED Ready	LED Fault	LED Com	Meaning
Off	Off	Off	No operating voltage
Flashes 1 Hz	Off	Flashes irregularly	Switching on of the operating voltage, network initialization
On	Off	Flashes irregularly	Operating voltage present, network initialization successful, system in operation
On	Flashes 1 x *	Flashes irregularly	Error on a module. This error was detected by another module (SegmentControl or ComControl) but is also shown on the CentralControl via flashing. This type of error can be determined on the specific module by the number of flashes (see "Error signaling", page 64).
Off	Flashes 4x *	Flashes irregularly	Voltage error
Off	Flashes 6x *	Flashes irregularly	System error

SegmentControl/ComControl

The meaning of the LEDs is the same for the SegmentControl and ComControl. Thus, for improved clarity, these modules are referred to jointly as module in the following table.

LED Ready	LED Fault	LED Com	Meaning
Basically			
Off	Off	Off	No operating voltage
Off	On	Off	Fuse triggered, module is faulty
Non-addressed operating mode			
Off	Off or flashing *	On	Module does not have a valid address (state on delivery or after resetting the module)
Addressed and parameterized operating status			
On	Flashes 6x *	On	Module has a valid address but no valid parameter data, there is a connection to the CentralControl/GatewayControl.

Troubleshooting

LED Ready	LED Fault	LED Com	Meaning
On	Off or flashing *	Off	Module has a valid address and valid parameter data, there is not connection to the GatewayControl/CentralControl or the connection is faulty.
On	Off or flashing *	On	Module has a valid address and valid parameter data, there is a connection to the CentralControl/GatewayControl. RollerDrive is not controlled.
Flashes 1 Hz	Off or flashing *	On	Module has a valid address and valid parameter data, there is a connection to the CentralControl/GatewayControl. RollerDrive is controlled.
On	Off	Flashing 2 Hz	Module performs local or global initialization. RollerDrive is controlled as the zone sensor is unblocked.
Flashes 1 Hz	Off	Flashing 2 Hz	Module performs local or global initialization. RollerDrive is not controlled as the zone sensor is blocked.
Addressing mode (conveyor faults are neither detected nor displayed.)			
Off	Flashes 1 Hz	Flashing 1 Hz	Module in addressing mode (addressing magnet is stopped for more than 3 seconds)
Flashes 1 Hz	Flashes 1 Hz	Flashing 1 Hz	Module is temporarily addressed (part of the route is not yet fully addressed and the address is not yet permanently saved, addressing magnet was removed)
Use of the addressing magnets (conveyor errors are neither detected nor displayed.)			
On	On	On	Addressing magnet is detected, module has a permanent address, there is connection to the CentralControl/GatewayControl.
On	On	Off	Addressing magnet is detected, module has a permanent address, there is no connection to the CentralControl/GatewayControl or the connection is faulty.
Off	On	On	Addressing magnet detected, module does not have a valid address.
On	On	Flashing 1 Hz	Magnet contact actuated between 1 and 3 seconds, self-test is activated, when the addressing magnet is removed, the module has a valid address
Off	On	Flashing 1 Hz	Magnet contact actuated between 1 and 3 seconds, self-test is activated, when the addressing magnet is removed, the module does not have a valid address
Off	Flashes 1 Hz	Flashing 1 Hz	Module does not have a valid address, magnet contact actuated between 3 and 10 seconds, module has a temporary address on removal of the addressing magnet
On	Flashes 1 Hz	Flashing 1 Hz	Module has a valid address, magnet contact actuated between 3 and 10 seconds, normal conveying mode is activated, there is no reaction
Flashes irregularly	On	Flashes irregularly	Magnet contact is actuated for more than 10 seconds, the address and parameters are deleted, module is reset to the state on delivery.

* LED flashes 1 to 6 times (depending on the error) within the space of 3 seconds for 250 ms. The error type can be determined based on the number of flashes (see "Error signaling", page 64).

Troubleshooting

Error signaling

The error type can be determined based on the number of times the Fault-LED flashes (each 3-second interval):

Number of flashes	Error	Troubleshooting
1	Release mode error: Error is triggered as the time out 1 or time out 2 time period is exceeded.	Reset power or with time out 1, reset by blocking the subsequent zone sensor or with time out 2, reset by blocking the zone sensor. Zone performs local initialization and starts conveying mode.
2	Sensor error signal (when using sensors with contamination display)	Clean sensor. Error reaction and action upon remedying can be parameterized
3	RollerDrive not connected	RollerDrive connect
	RollerDrive not connected properly	RollerDrive Connect properly
	RollerDrive emits error signal	Remedy error, RollerDrive automatically resets error signal
	SegmentControl incorrectly parameterized: the right-hand connection of a SegmentControl for connection of a Slave RollerDrive is parameterized but not connected	Change parameterizing
		Error reaction and action upon remedying can be parameterized
4	Voltage error (voltage on the module is less than 19 V but more than 26 V)	Remedy cause of overvoltage or undervoltage The error reaction and necessary troubleshooting can be parameterized
5	Excess temperature at the relevant module	The necessary troubleshooting and action upon remedying can be parameterized

Troubleshooting

Number of flashes	Error	Troubleshooting
6	System error: <ul style="list-style-type: none"> • deviating operating voltage • Communication fault • Module is missing or is not addressed • Module does not have parameters • Termination error • Parameter PG1 is incorrectly (only with GatewayControl) parameterized 	Reset power



When one of the above-mentioned errors occurs, the entire conveyor stops conveying.

LED display when using the addressing magnet

Holding time [seconds]	LED status	Reaction
0-1	LED Fault lights up	Addressing magnet was held correctly against the contact point. There is no reaction when removed
1-3	LED Com flashes	Self-test starts when removed. With addressed and parameterized modules, the self-test can be started if the zone sensor is not blocked. (Further information see "Self-test", page 58)
3-10	LEDs Com and Fault flash	Configurator connected and addressing started in the "Address" work step: The module is given a temporary address on removal. As long as all modules of the planned addressing are not addressed, all three LEDs light up in parallel. Addressing via the Configurator not started: Com and Fault continue to flash on removal. The LED's can only be reset with a power reset. There is no addressing.
>10	Off	Module does not have an address: No reaction Module has an address: After 10 seconds the module is reset to default setting; address and parameters are lost.

Troubleshooting

Troubleshooting

ConveyorControl is a complex system. There are many interactions between all system components. Naturally, errors can occur in such a system which either result from the conveying processes or the interaction between the individual components. When using the CentralControl not all errors can be shown in detail and the error location and display location cannot always be allocated to each other. Improved error diagnostics are possible with a GatewayControl together with an PLC.

For error diagnostics, it is also important that the correlations with the modules adjacent to the module displaying a fault are also taken into account. Example:

- If the reaction to a RollerDrive error has been parameterized as "Ignore error" it is not displayed on occurrence. The RollerDrive error can result in a release mode error which is then displayed. Summary: A release mode error is displayed yet the cause of this is a RollerDrive error.
- If the reaction to a RollerDrive error has been parameterized as "LED flashing" it is displayed on occurrence. If, however, the RollerDrive error triggers a release mode error, this is shown as the error which last occurred is always shown. Summary: A release mode error is displayed yet the cause of this is a RollerDrive error.

If troubleshooting is not successful, please contact Interroll support and have the following information at hand:

- A complete image of the module with the parameterization data and details of the serial numbers of all modules (ideally the Configurator project file providing this is identical with the conveyor).
- Details of the LED displays of all modules. The module displays where an error is suspected, are often not sufficient. It is also important to describe the CentralControl error display.
- Details of operation of the conveyor before the error (as far as possible) as well as how the module reacts when it is attempted to remedy the error. A power reset should be the last step here.

Troubleshooting

Symptom	Possible cause	Help
The ConveyorControl system is not working or is working incorrectly	No or insufficient power supply	<ul style="list-style-type: none"> ➤ Check whether the output voltage of the power supply is within the specified voltage range. ➤ Check the connections and correct if necessary.
ConveyorControl system module faulty or damaged	Internal fuse triggered or faulty.	<ul style="list-style-type: none"> ➤ Replace ConveyorControl system module.
RollerDrive does not rotate	RollerDrive not or not correctly inserted, control module or RollerDrive faulty	<ul style="list-style-type: none"> ➤ Check whether the power supply is within the specified voltage range. ➤ Check the connections and correct if necessary. ➤ RollerDrive Replace if necessary
	Zone sensor is incorrectly parametrized (PNP/NPN or normally open / normally closed) or faulty	<ul style="list-style-type: none"> ➤ Check the sensor's settings or replace the sensor if necessary
Conveyor process interrupted	Packages jammed	<ul style="list-style-type: none"> ➤ Remove jammed packages.
	Overheating of the chopper resistor: The application feeds back too much energy or the power supply is too high	<ul style="list-style-type: none"> ➤ Allow to cool down. ➤ Check the application properties and adjust if necessary, check the power supply and set to 24 V is necessary
	Line interruption of bus communication	<ul style="list-style-type: none"> ➤ Check bus communication.
	Modules were addressed in the wrong order	<ul style="list-style-type: none"> ➤ Perform addressing again.
Package stops briefly at the sensor although the next zone is unblocked	The sensor signal bounces for longer than the integrated lock time (especially when using light barriers) and, as such, there is delayed or double recognition of the package (<i>see page 46</i>).	<ul style="list-style-type: none"> ➤ Use light barriers or, if necessary, optimize the position of the light switch
Addressing cannot be performed or only with problems	Bus line not contacted or contact is faulty	<ul style="list-style-type: none"> ➤ Check the bus line and, if necessary, create contact at a new point

Abandonment and disposal

Shut-down



CAUTION

Risk of injuries due to incorrect handling

- Shut-down may only be executed by qualified and authorized persons.
- The ConveyorControl system may only be shut down after switching off the power. The ConveyorControl system is to be protected from being turned on accidentally.

- Disconnect all cables from the ConveyorControl system modules.
- Unscrew the screws attaching the ConveyorControl system modules to the conveyor frame.
- Remove all ConveyorControl system modules from the conveyor frame.

Disposal

The operator is responsible for the proper disposal of the ConveyorControl modules.

- When doing so, industry specific and local regulations on disposal and packaging must be observed.

Appendix

Accessories

Designation	Order number
SegmentControl	1004024
ComControl	1004025
CentralControl	1004027
Power supply unit	1004029
Flat cable power (3G3G-FL, 2 x 2,5 mm ² , black, 25-m pieces)	1004030
Flat cable bus communication (3G3G-FL, 2 x 1,5 mm ² , yellow, 50-m pieces)	1004031
Spacer sleeves	1001021
Extension cable RollerDrive EC310, (2 m long)	1004033
Light barrier	1004518

Appendix

Possible wiring of the inputs

The functions of the inputs 'In1', 'In2' and 'In3' on the ComControl must be parameterized. Without parameterizing a zone sensor which, for example, is connected to 'In1' of a ComControl will not work. The function of each input can be selected from a predefined list. When a function for an input has been specified, this function will always be performed when the signal is pending at the relevant input.



The signals must not be activated during global initialization (except the zone sensor and start sensor). The signals must be active when the power supply to the conveyor is switched on or they must be activated during conveying (i.e., after initialization).

The following functions can be set:

- *Not used*
- *Zone sensor*
- *Start sensor*
- *Start D one zone*
- *Start Z one zone*
- *Stop D one zone*
- *Stop D all zones*
- *Stop Z one zone*
- *Stop Z all zones*
- *Clear*
- *Clear reverse*
- *Alternative speed*
- *Conveyor direction*

In the case of the functions *Clear*, *Clear reverse*, *Stop D all zones* and *Conveyor direction* the conveyor automatically performs global initialization after deactivation of the signal. In the case of the functions *Start D one zone* and *Stop D one zone* the conveyor automatically performs local initialization for the relevant zones after deactivation of the signal (see "*Initialization*", page 11).



If the parameter PZ15 = 0 has been set, there is no local initialization.

Not used

The default setting of every input is firstly parameterized to *Not used*. This means that this input cannot be evaluated.

Zone sensor

A sensor is connected to this input which is evaluated as a zone sensor. When using a ComControl an input must be parameterized as a zone sensor.

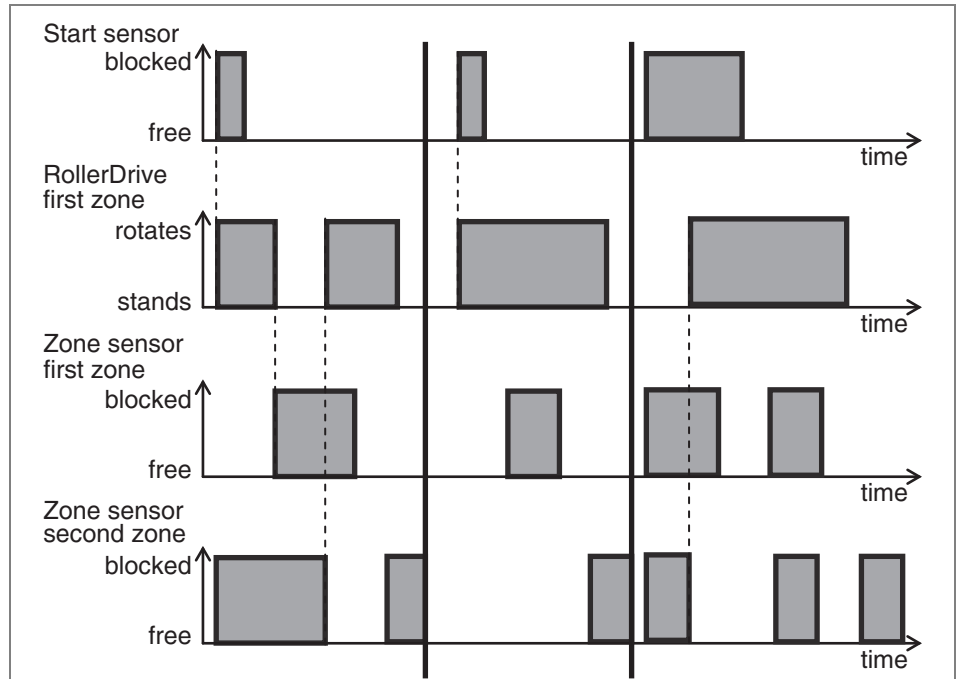
Start sensor

A sensor is connected to this input which issues a start signal for the RollerDrives. This function may only be used for the first zone of a route. The start sensor serves to communicate with an upstream conveyor and should be located at the end of this module. It recognizes when a package is to be accepted and reports this to the ComControl of the first zone.

Appendix

The start sensor is subject to the release mode time checks:

- If the start sensor is blocked for longer than defined via the parameter PZ6 (*TimeOut1*), the action defined under parameter PZ7 (*TimeOut1 Reaction*) is triggered.
- If the start sensor becomes unblocked after blocking, the time until the zone sensor of the first zone is blocked is measured. If this time period exceeds the time defined via parameter PZ8 (*TimeOut2*) the action defined under parameter PZ9 (*TimeOut2 Reaction*) is triggered.



Start D one zone

This signal starts the respective RollerDrive (which is connected to the ComControl for which the signal applies). The zone sensor signal is ignored while the signal is active; the RollerDrive continues to rotate as long as the signal is active. For the upstream and downstream zone, the zone for which the signal is active, is blocked – no packages are transported and the subsequent anticipates a package even if the zone sensor is not blocked. *TimeOut1* is thus possible if the time during which the signal applies exceeds the time set under PZ6. Local initialization is performed when the signal is deactivated.



If the parameter PZ15 = 0 has been set, there is no local initialization.

Start Z one zone

This signal starts the respective RollerDrive whilst taking the principle of zero pressure accumulation transportation into account. This means that the signal impact depends on the following factors:

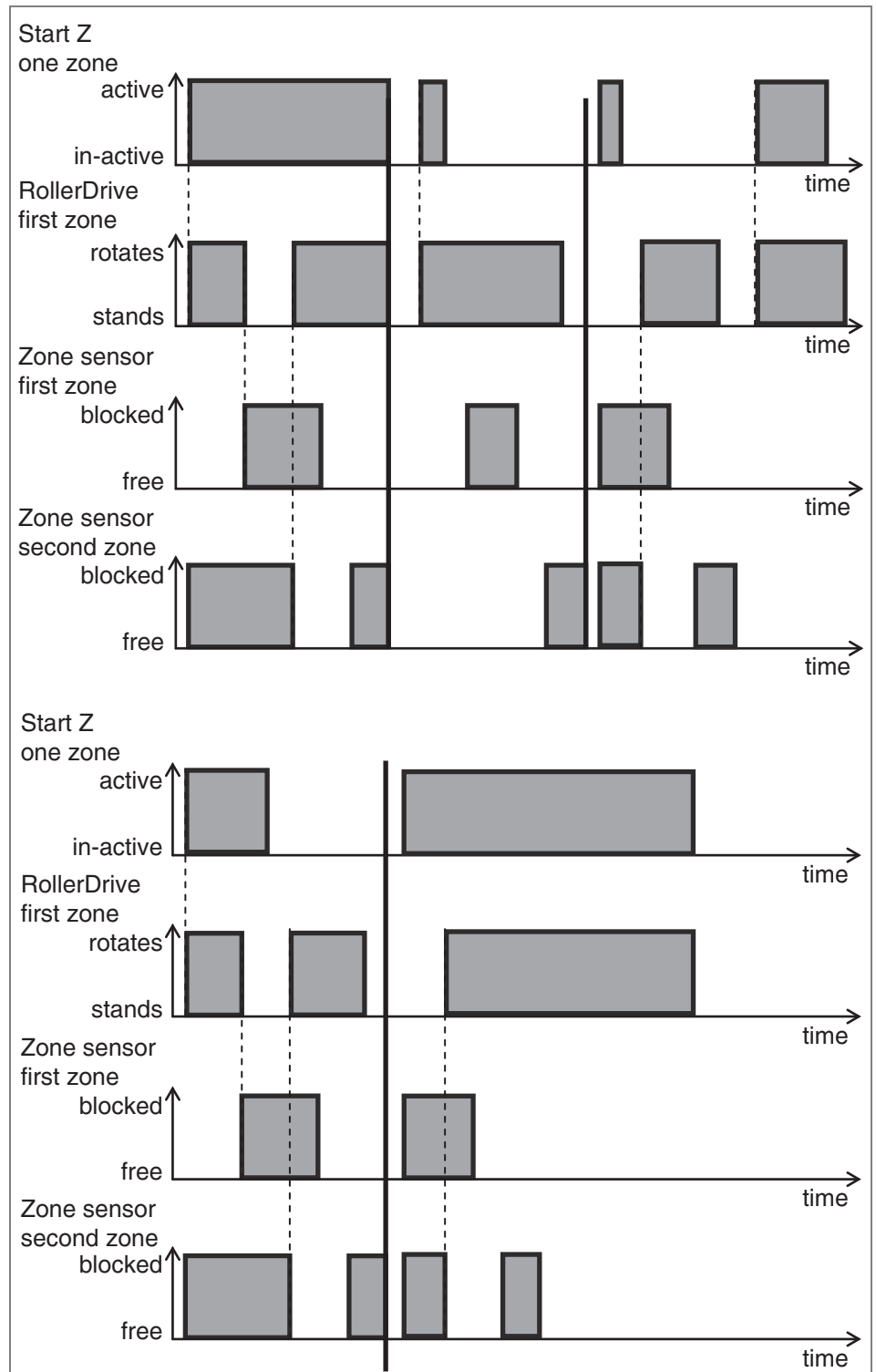
- Zone sensor signal from the own or adjacent zones
- Position of the zone within the route (start zone, middle zone, end zone)
- Set release mode (single or train release)

The signal is not monitored by PZ6 (*TimeOut1*) and is to be used for the first and last zone of a conveyor.

Appendix

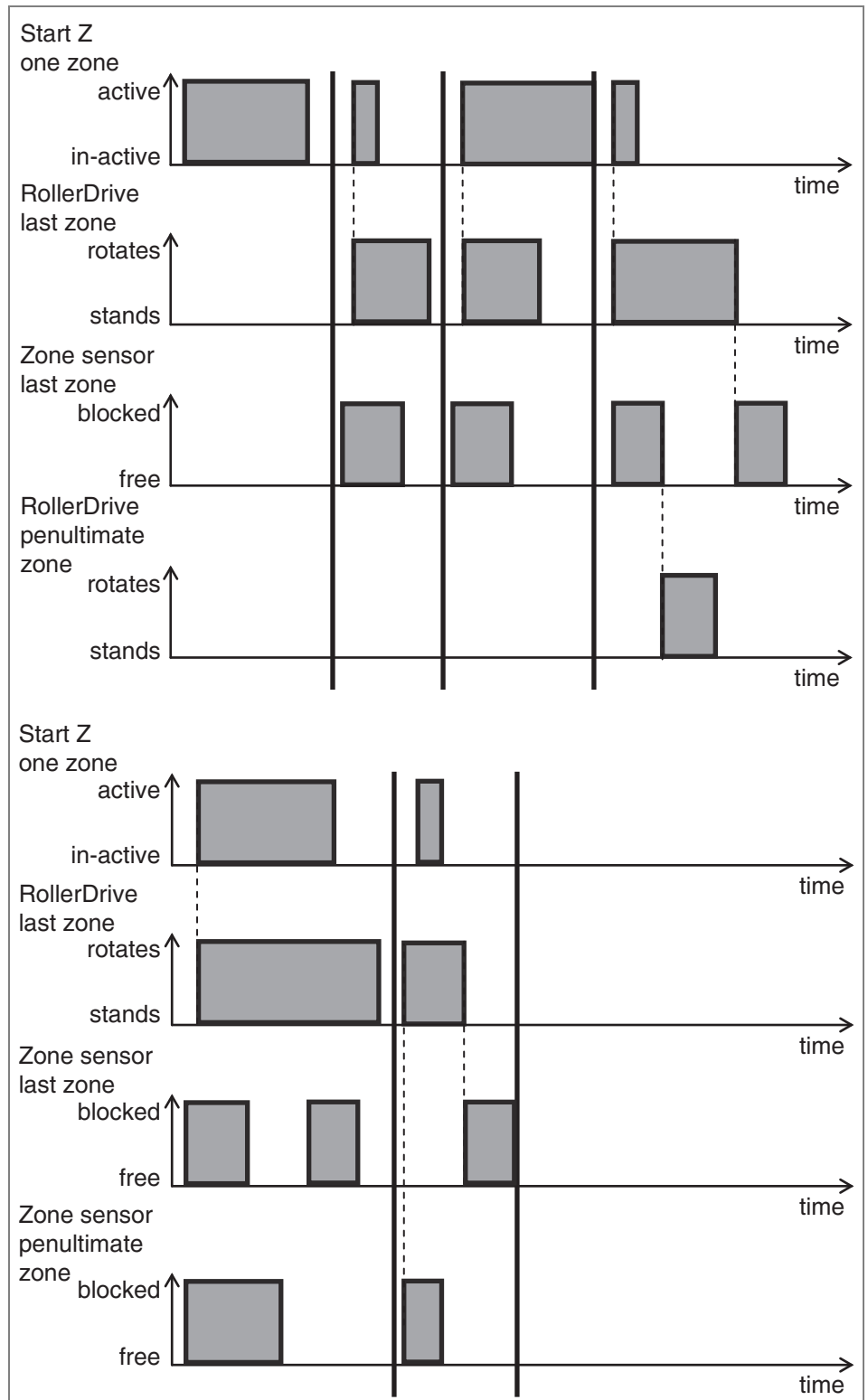
Single release

The following diagram shows the functioning of the signal *Start Z one zone* at a start zone:



Appendix

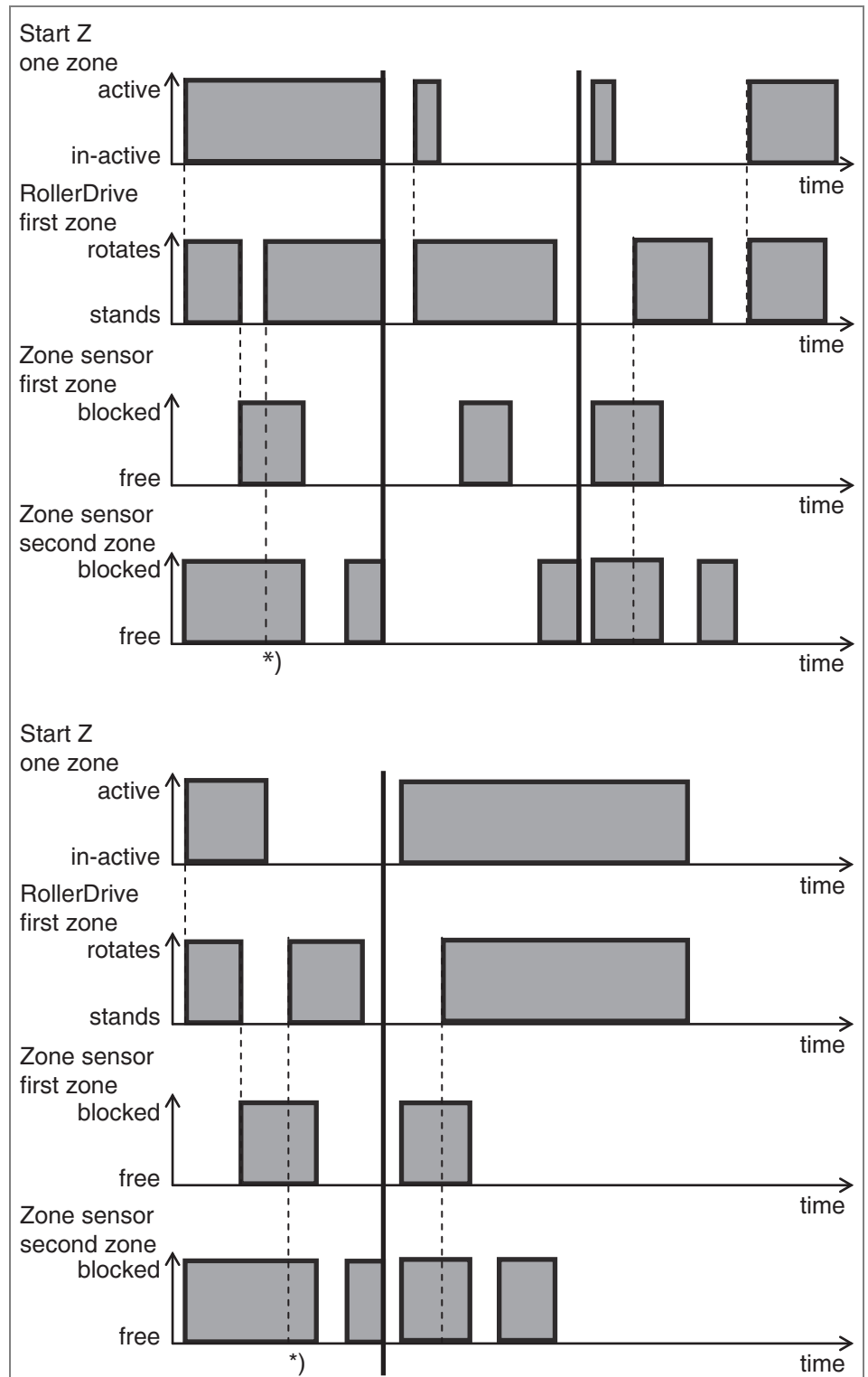
The following diagram shows the functioning of the signal *Start Z one zone* at an end zone when the single release mode is set



Appendix

Train release

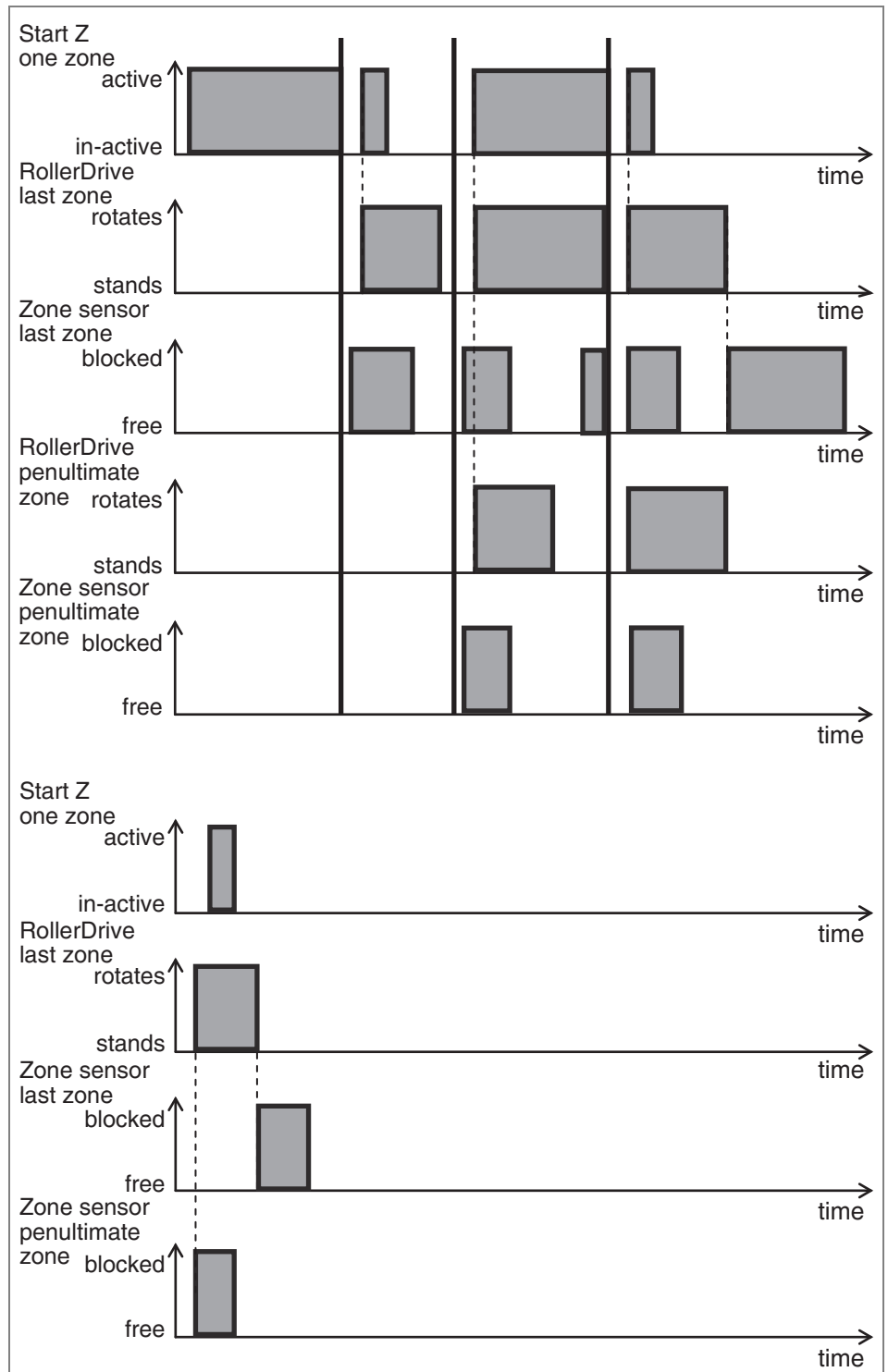
The following diagram shows the functioning of the signal *Start Z one zone* at a start zone with the setting of the parameter PZ12 = 0 seconds:



* A start signal at zone two or another zone causes all RollerDrives upon which packages have come to a halt to start again.

Appendix

The following diagram shows the functioning of the signal *Start Z one zone* at an end zone when the block release mode is set.



Appendix

Stop D one zone

This signal stops the respective RollerDrive (which is connected to the ComControl for which the signal applies).

- The zone sensor signal is ignored while the signal is active; the RollerDrive stops for as long as the signal is active.
- For an upstream zone, the zone for which the signal is active, is blocked, i.e., no packages are conveyed.
- For a downstream zone, the zone for which the signal is active, is unblocked.
- Local initialization is performed when the signal is deactivated.



If the parameter PZ 15 = 0 has been set, there is no local initialization.

Stop D all zones

This signal immediately stops all RollerDrives in the conveyor. This also applies when local or global initialization is performed. The zone sensor signals are ignored whilst the signal is active; all RollerDrives stop for as long as the signal is active. If the signal is active whilst the power supply to the conveyor is switched on or the step *Download* is being done, there is no global initialization. Global initialization is performed when the signal is deactivated.

Stop Z one zone

This signal stops the respective RollerDrive (which is connected to the ComControl for which the signal applies) whilst taking the principle of zero pressure accumulation transportation into account. This means:

- For a downstream zone, the zone for which the signal is active, is unblocked for the duration of the signal.
- If the signal is active and the respective sensor is unblocked, the next package is transported up to the zone sensor and stops there. This also applies if the next zone is or becomes unblocked.
- If the signal is active, the respective zone sensor is blocked and the relevant RollerDrive continues to rotate, then the package is transported into the next zone and the next package is stopped providing the signal is still active.
- If the signal is active, the respective zone sensor is blocked and the relevant RollerDrive is no longer rotating, the package is no longer transported. This also applies if the next zone is unblocked. The package is not transported again until the signal is deactivated.

If the value of the parameter PZ13 (*SensorDelay*) is not zero, this delay also applies here, i.e., the package does not stop at the zone sensor but after the set delay time.

There is no initialization when the signal is deactivated.

Appendix

Stop Z all zones

This signal stops all RollerDrives whilst taking the principle of zero pressure accumulation transportation into account. The function is identical to the signal *Stop Z one zone* yet effects all zones simultaneously. With this signal it is possible to stop conveying in a defined manner. This means that all packages stop at a zone sensor and thus all come to a halt precisely within one zone.

- If the signal is active whilst the power supply to the conveyor is switched on or the step *Download* is being carried out, global initialization is performed as normal.
- After initialization, the conveyor does not start conveying and, instead, stops.
- If the signal is issued during global initialization, this is ended as normal and the conveyor then stops without switching to release mode.
- There is no initialization when the signal is deactivated.

Clear

This signal immediately starts all RollerDrives in the conveyor. Each RollerDrive rotates according to the properties defined in parameters PD1 to .

- The zone sensor signal is ignored whilst the signal is active; the RollerDrives continue to rotate for as long as the signal is active.
- This signal serves to immediately empty the conveyor in the conveyor direction.
- If the signal is active whilst the power supply to the conveyor is switched on or the step *Download* is being carried out, there is no global initialization.
- If the signal is activated during global initialization, global initialization is interrupted and the *Clear* signal is implemented.
- Global initialization is performed when the signal is deactivated.

Clear reverse

This signal immediately starts all RollerDrives in the opposite direction. The function is identical to *Clear* only that the setting of the PD3 parameter is inverted (*RDDirection*) and, accordingly, the conveyor is emptied in the opposite conveying direction.

Alternative speed

With this signal, the conveying speed can be switched between the value of the PD4 parameter (*MainSpeed*) and the value of the PD5 parameter (*AlternativeSpeed*).

If the signal is not active, each RollerDrive rotates at the speed which results from the PD1, PD2 and PD4 settings. If the signal is active, each RollerDrive rotates at the speed which results from the PD1, PD2 and PD5 settings. Activation or deactivation of the signal is immediately effective, even if initialization is being performed at the same time.

Appendix

Conveyor direction

This signal changes the rotating direction of all RollerDrives in the conveyor and the zero pressure accumulation logic direction. Various preparations must be made before this signal can be activated.

One of the principle of zero pressure accumulation conveying is that there is only one package in each zone and that this does not project into the adjacent zones (see "Zero pressure accumulation conveying", page 10). In order to achieve this, a zone sensor is positioned at the end of each zone. If only the conveyor direction were to be reversed, the zone sensors would be at the start of each zone and, thus, the packages would always travel into the upstream zone.

To avoid this, the following changes must be made to the conveyor if a change in the conveyor direction is planned:

- All the zone sensors in the conveyor must be positioned in the middle of the respective zone.
- Using the parameter PZ13 (*SensorDelay*) a sensor signal delay must be set. This delay means that a package does not stop when the sensor is reached but at the set delayed time. The delay is calculated based on half the length of the longest package and the speed of conveying. It should be set so that all packages in their entirety come to a halt within a zone. We recommend determining the delay time using empirical tests.

Thanks to these measures, conveying is possible in both directions without packages stopping in part in a second zone.

If the signal is activated or deactivated, initialization in the relevant direction is performed. If the signal is activated during initialization, initialization is stopped immediately and initialization in the new conveying direction is performed.

If the signal is activated whilst another signal which affects the entire signal (e.g. *Clear*) is activated, the conveying direction is not changed until the other signal has been deactivated.



The conveying direction can only be reversed if all packages are roughly the same length. The shortest package must be more than half the length of the longest package. If the shortest package is shorter than this, it is transported out of the detection area of the centrally located sensor during the delay period.

Appendix

Prioritizing of signals

If several signals are activated simultaneously, they are carried out according to their priority.

- A higher priority signal can override a lower priority signal.
- A lower priority signal cannot override a higher priority signal.
- If a higher priority signal is deactivated and a lower priority signal is still active, the function of the lower priority signal is carried out once the higher priority signal has been deactivated.
- The same signals at various points are linked with OR.
- The *AlternativeSpeed* signal is always immediately implemented.

The following signals are of high priority:

- *Stop D one zone*
- *Stop D all zones*

The following signals are of medium priority:

- *Clear*
- *Clear reverse*

The following signals are of low priority:

- *Stop Z one zone*
- *Stop Z all zones*
- *Conveyor direction*

Appendix

Possible wiring of the ComControl outputs

The functions of the outputs 'Out1', 'Out2' and 'Relay' on the ComControl must be parameterized. The function of each output can be selected from a predefined list:

- *Not used*
- *Error signal*
- *Aux RD start*
- *Zone status*
- *Sensor signal*
- *Input signal 2*
- *Input signal 3*

Not used

The default setting of every output is *Not used*. This means that the output is not active.



An output parameterized to *normally closed* will output 24 V when *Not used* is set.

Error signal

Errors in the conveyor can be indicated with this setting. The signal does not indicate the type of error. If an output is parameterized as an error output, it always provides the error information on the entire conveyor. Sub-areas for the error signal cannot be created.

Aux RD start

If in a zone a second RollerDrive is to be controlled via a ComControl an output with this setting must be parameterized. The signal on this output is activated simultaneously with the start signal of the first RollerDrive. This output should then be connected with one of the Speed inputs of an Interroll DriveControl 20/54. The second RollerDrive can then only be controlled with respect to the start signal via the ConveyorControl. All the other functions are not available. This means that the speed and direction of rotation must be set using the dip switch of the DriveControl 20/54 and cannot be changed via the ConveyorControl. Functions such as, for example, switching of the direction of rotation or switching to a second speed can then not be used. Possible RollerDrive errors will still only be displayed via the DriveControl 20/54, and not the ConveyorControl.

For these reasons, it is better to connect a Slave RollerDrive to a SegmentControl as this offers more options.

ZoneStatus

The *Zone Status* signal can be used for handshaking with external systems. The zone status reacts depending on the position of the zone (start, middle or end zone) and the release mode set. If there is an error, the zone status issues a 'Low' signal. During global or local initialization, the zone status is 'Low'.

Appendix

Single release:

As a rule, the zone status is always 'High' when the zone sensor is blocked.

- **Start zone:**
The zone status is 'High' once a package has left the start sensor or the signal *Start Zone zone* is deactivated again. The zone status changes to 'Low' once the zone sensor is no longer blocked.
- **Middle zone:**
The zone status is 'High' once a package has reached the zone sensor. The zone status changes to 'Low' once the zone sensor is no longer blocked.
- **End zone:**
The zone status is 'High' once a package has left the second last zone. A package can be conveyed out of the last zone via the signal *Start Zone zone*. If, in this case, the package is conveyed out, the zone sensor changes to 'Low' once the package has left the zone sensor.
- **General:**
If the signal *Start D*, *Clear* or *Clear reverse* is activated, the zone status is 'High'. If the signal is deactivated again, the zone changes to 'Low' again. This applies to all zones (start, middle and end zone). A package has stopped. It is removed manually, the zone sensor becomes unblocked. The zone status is 'Low' in the start zone on expiry of the *PermissionDelay* and in a middle or end zone once the zone sensor changes to unblocked.

Train release:

- **Start zone:**
The zone status is 'High' once a package has left the start sensor or the signal *Start Zone zone* is deactivated again. The zone status remains 'High' when the package stops. If the zone sensor in the downstream zone changes to unblocked, the zone status changes to 'Low' on expiry of the time set under PZ12. If the downstream zone is unblocked, the zone status is 'Low' once the package has reached zone sensor (and not on leaving the zone sensor).
- **Middle zone:**
The zone status is 'High' once the package blocked the zone sensor. The zone status is 'Low' again once the package has left the zone sensor. The zone status remains 'High' when the package stops. If the sensor in the next zone is unblocked, the zone status changes to 'Low' on expiry of the time set under PZ12.
- **End zone:**
The zone status is 'High' once the package blocks the zone sensor. Without the start signal the zone status remains 'High' as the package in the last zone comes to a halt. Upon activation of the signal *Start Zone zone* the package is transported out of the end zone. The zone status is 'Low' once the package has left the zone sensor (the time set under PZ12 is not taken into account).

Sensor signal

An output with this setting copies the signal of the zone sensor which is connected to the ComControl. This allows it to be used for other functions.

Input signal 2, Input signal 3

An output with this setting copies the signal which was given on the relevant input.

Appendix

Glossary of parameters

- PD1** *GearRatio*: With PD1 the gear ratio of the RollerDrive can be chosen from a list for the selected zones. The default setting is 12:1. This parameter is subject to a plausibility check (see "*Parameterizing modules*", page 32).
- PD2** *RDDiameter*: With PD6 the diameter of the RollerDrive can be defined for the selected zones. Diameters of between 50 and 80 mm can be set. The default setting is 50 mm. This parameter is subject to a plausibility check (see "*Parameterizing modules*", page 32).
- PD3** *RDDirection*: With PD3 the direction of rotation of the RollerDrive can be defined for the selected zones. The default setting is clockwise from cable side.
- PD4** *MainSpeed*: With PD4 the speed of the RollerDrive can be defined for the selected zones. The speed can be set between the minimum and maximum levels up to an accuracy of 2 decimal points. The default setting is 1.3 m/s. This parameter is subject to a plausibility check (see "*Parameterizing modules*", page 32).
- PD5** *AlternativeSpeed*: With PD5 an alternative speed for the RollerDrive can be defined for the selected zones. The speed can be set between the minimum and maximum levels up to an accuracy of 2 decimal points. The default setting is 1.3 m/s. This speed can be activated via a signal on a ComControl in the conveyor (see "*Alternative speed*", page 77). The signal affects all connected RollerDrives. This parameter is subject to a plausibility check (see "*Parameterizing modules*", page 32).
- PD6** *RDAcceleration*: With PD6 acceleration of the RollerDrive can be influenced for the selected zones. If the value is set to 0 m/s² (default setting), this impact is switched off. Acceleration then results from the application properties. The quickest acceleration is achieved with the value 0.01 m/s². The quickest possible acceleration of the RollerDrive is achieved already with 2.00 m/s² for most applications. The acceleration value can be set to a maximum of 10 m/s² and be entered with up to two decimal places.
- PD7** *RDDeceleration*: With PD7 deceleration when braking the RollerDrive can be influenced for the selected zones. If the value is set to 0 m/s² (default setting), this impact is switched off. Deceleration then results from the application properties. The longest deceleration is achieved with the value 0.01 m/s². The quickest possible deceleration of the RollerDrive is achieved with 2.00 m/s² for most applications. The deceleration value can be set to a maximum of 10 m/s² and be entered with up to two decimal places.
- PIN1** *LogicType*: With PIN1 the switching level can be specified for the selected zones. With PNP a high signal is detected when 24 V is reached. With NPN a high signal is detected when connected to ground. PIN1 is available in the tabs *Sensor* (for the SegmentControl) and *In 1*, *In 2* and *In 3* (for the ComControl). The default setting is PNP.

Appendix

PIN2 *SwitchType*: The logic type can be specified for the selected zones with PIN2. With the setting *normally closed* a switch is assumed to be normally closed. With the setting *normally open* a switch is assumed to be normally open. PIN2 is available in the tabs *Sensor* (for the SegmentControl) and *In 1*, *In 2* and *In 3* (for the ComControl). The default setting is *normally open*.

Example for the signal *Stop1 all zones*: If a ComControl input is parameterized with this signal, *PNP* and *normally open*, a 24 V signal at the input of the ComControl causes all RollerDrives connected in the conveyor to stop.

PIN3 *LowgainInput*: With PIN3 it can be specified for the selected zones whether the sensor connected at the input has a low gain output. The signal logic is based on the sensor logic (see setting under PIN1 and PIN2). If a sensor emits the low gain signal, this is recognized as an error and the relevant measures are taken. PIN3 can be selected for the sensor inputs SegmentControl and for *In 1* and *In 2* of the ComControl. *In 3* cannot handle low gain. The default setting is *Without*, i.e., there is no assessment of contamination.

PIN4 *Function*: The function of the respective input can be specified for the selected zones with PIN4 (see "*Possible wiring of the inputs*", page 70). The default setting is *Not used*, i.e. no input function.

POUT1 *LogicType*: POUT1 cannot be set and, instead, parameterized permanently to the value *PNP*. This parameter is available with the outputs *Out 1* and *Out 2*.

POUT2 *SwitchType*: The release mode can be specified for the selected zones with POUT2. With the setting *normally closed* a switch is assumed to be normally closed. With the setting *normally open* a switch is assumed to be normally open. POUT2 is available in the tabs of the three outputs. The default setting is *normally open*.

Example for the signal *Error output*: An output of a ComControl is parameterized as *Error signal* and *normally closed*. If no error occurred, the output is 24 V; if an error occurs, the output switches to ground potential.

POUT3 *Function*: The function of the respective output can be specified for the selected zones with POUT3 (see "*Possible wiring of the ComControl outputs*", page 80). The default setting is *Not used*, i.e. no output function.

POUT4 *SignalDelay*: A delay of the relevant output signal can be parameterized for the selected zones with POUT4. The maximum delay which can be set is 10 seconds. POUT4 is available in the tabs of the three outputs. The default setting is 0 seconds.



If a delay is set for the sensor signal with PZ13 and the zone sensor signal is parameterized for an output, the switch delay would be added to the sensor delay.

PZ2 *UpStreamAdr*: If only one zone has been selected, PZ2 shows the following information of the selected upstream zone:

- Module type (CC for ComControl and SC for SegmentControl)
- The number assigned to the module in the *Construct* stage.
- In the case of a SegmentControl: whether the reference is to the left or right zone of the SegmentControl

When either several zones or the first zone of a conveyor line are selected, nothing is displayed. PZ2 cannot be set and only read out.

Appendix

- PZ3** *DownStreamAdr*: If only one zone has been selected, PZ3 shows the following information of the selected downstream zone:
- Module type (CC for ComControl and SC for SegmentControl)
 - The number assigned to the module in the *Construct* stage.
 - In the case of a SegmentControl: whether the reference is to the left or right zone of the SegmentControl

When either several zones or the first zone of a conveyor line are selected, nothing is displayed. PZ3 cannot be set and only read out.

- PZ4** *AdrSlaveRD*: In some applications, the use of a second RollerDrive (Slave RollerDrive) within a zone is necessary. PZ4 can be used to parameterize from which SegmentControl or ComControl this Slave RollerDrive is to be controlled.

In the simplest case, the master RollerDrive is controlled by a SegmentControl which controls just one zone. In this case, the Slave RollerDrive can be connected to the right of the SegmentControl. In this case, the module which controls the zone is identical with the module to which the Slave RollerDrive is connected. It is also possible that the control of the Slave RollerDrive is handled by a module to which the former is not directly connected. PZ4 can be used to parameterize to which module the Slave RollerDrive is connected.

This parameter can be set for a SegmentControl or a ComControl. The numbers of all the SegmentControls in the conveyor which control just one zone are shown in a list and the relevant SegmentControls can be selected. If no SegmentControls which control just one zone are used, the selection list comprises just the value *None*. The default setting is *No Slave RD*.

- PZ5** *ReleaseMode*: With PZ5 the release mode can be specified for the selected zones, i.e., either with *Single release* or with *Train release* (see "*Zero pressure accumulation conveying*", page 10). Train release should only be selected if a high package throughput is necessary. Zones with differing release modes can be parameterized within a conveyor. The default setting is *Single release*.

- PZ6** *TimeOut1*: With PZ6 the time can be specified after which a *TimeOut1* error should occur if a zone sensor does not become unblocked although the RollerDrive is running. If the RollerDrive is started to transport a package, the *TimeOut1* time is also started. If the package is unable to leave the sensor within the time defined by PZ6, a *TimeOut1* error occurs. This, for example, allows jammed packages to be detected. If PZ6 is set to zero, the time is not monitored. A maximum of 15 seconds can be set, the default setting is 5 seconds.

- PZ7** *TimeOut1 Reaction*: With PZ7 it can be specified for the selected zones what should happen when a *TimeOut1* error occurs.
- If *Ignore error* is selected, nothing happens after expiry of *TimeOut1*. The RollerDrive will continue to rotate for as long as the zone sensor is blocked.
 - If *Zone stop + LED flashing* is selected, the error is displayed via the Fault-LED on the relevant module, an error is output via an output on a ComControl and the RollerDrive in the zone is stopped. The error can be reset by a power reset or by blocking the zone sensor of the downstream zone. After resetting the error, local initialization is performed in the downstream zone.

The default setting is *Zone stop + LED flashing*.

Appendix

PZ8 *TimeOut2*: With PZ8 the time which can pass from the upstream zone sensor becoming unblocked until the actual zone sensor is blocked can be specified for the selected zones. When the package has left the upstream zone (i.e., the upstream zone is unblocked), the *TimeOut2* time is started. If the package is unable to reach its zone sensor within the time defined by PZ8, a *TimeOut2* error occurs. This, for example, allows packages which got stuck or have been removed manually to be detected. If PZ8 is set to zero, the time is not monitored. In this case if the package is removed manually, the RollerDrive would continue to rotate until the respective zone sensor is blocked (e. g., by the next package). A maximum of 15 seconds can be set, the default setting is 5 seconds.

PZ9 *TimeOut2 Reaction*: With PZ9 it can be specified for the selected zones what should happen when a *TimeOut2* error occurs.

- If *Ignore error* is selected, nothing happens after expiry of *TimeOut2*. The RollerDrive will continue to rotate until another package blocks the zone sensor.
- If *Zone stop + LED flashing* is selected, the error is displayed via the Fault-LED on the relevant module, an error is output via an correspondingly parameterized output on a ComControl and the RollerDrive in the zone is stopped. The error can be remedied by a power reset or by blocking the zone sensor.
- If *Zone idle* is selected, the RollerDrive will switch off after expiry of *TimeOut2* if there are no further packages. The system thus accepts that a package has been removed.

The default setting is *Zone idle*.

PZ10 *AfterRunTime*: With PZ10 it can be specified for the selected zones how long RollerDrive should continue to rotate if there are no further packages. The RollerDrive does not switch off until this time has passed. This function prevents unnecessary start/stop operation if there are small gaps between the packages but also saves energy by switching off if there are no packages to be transported. If PZ10 is set to zero, the RollerDrive switches off immediately when the zone sensor becomes unblocked. The default setting is 4 seconds.

PZ11 *PermissionDelay*: With PZ11 it can be specified for the selected zones when a zone is to be assessed as 'unblocked' if a package within it is removed manually. If several packages come to a halt, and one is removed manually, the package from the upstream zone takes its place. This process can be delayed using PZ11. This, for example, enables operators to remove a package without another package immediately taking its place. A maximum of 10 seconds can be set, the default setting is 2 seconds.

PZ12 *TrainReleaseDelay*: With PZ12 the delay time between the start of the individual RollerDrives in train release mode can be specified. With train release, all packages are conveyed simultaneously. On starting, every RollerDrive produces a current peak. Thus, when all RollerDrives are started simultaneously, power supplies have to provide high power peak. To reduce the power supply unit output, it is recommended to slightly delay the start of the individual RollerDrives. This delay can be set between 0 and 2 seconds with PZ10. With a delay of zero, all RollerDrives start simultaneously. The default setting is 0.2 s.

Appendix

- PZ13** *SensorDelay*: With PZ13 it can be specified for the selected zones that the zone sensor signals are delayed. This, for example, is necessary if in the case of conveyors which convey in both directions, the zone sensor is positioned in the middle of the zone (see "Conveyor direction", page 78). The delay means that packages are started and stopped later. A maximum of 2 seconds can be set, the default setting is 0 seconds.
- PZ14** *GlobalInitTime*: The duration of global initialization can be specified for the selected zones with PZ14 (see "Initialization", page 11). The time should be set so that during this period a package can be transported from the start to the end of the zone, it is thus based on the length of the zone and the conveying speed. If PZ14 is set to zero, there is no initialization and the conveyor thus immediately starts conveying. Initialization prevents packages which have come to a halt due to a power loss between two sensors from colliding into each other. A maximum of 10 seconds can be set, the default setting is 4 seconds.
- PZ15** *LocalInitTime*: The duration of local initialization can be specified for the selected zones with PZ15 (see "Initialization", page 11). The time should be set so that during this period a package can be transported from the start to the end of the zone, it is thus based on the length of the zone and the conveying speed. If PZ15 is set to zero, there is no initialization and the conveyor thus immediately starts conveying. Initialization prevents packages which have come to a halt due to a power loss between two sensors from colliding into each other. A maximum of 10 seconds can be set, the default setting is 4 seconds.
- PZ16** *RDErrorMode*: With PZ7 it can be specified for the selected zones what should happen when a RollerDrive error occurs.
- If *Ignore error* is selected, the error is determined by the corresponding module but it is neither shown nor output and conveying is not stopped. It is highly likely that the error will be subsequently detected by a logic error. Packages may crash into each other.
 - If *LED flashing* is selected, the error from the Fault-LED is displayed on the relevant module and output via a correspondingly parameterized ComControl output. Conveying is not stopped. After resetting this error there is no local initialization, even if this is selected via PZ17.
 - If *Zone stop + LED flashing* is selected, the error is displayed via the Fault-LED on the relevant module, an error is output via an correspondingly parameterized output on a ComControl and the RollerDrive in the zone is stopped. The error can only be reset by connecting the RollerDrive correctly or by resetting the error signal of the RollerDrive. Interrupting conveying means that regardless of the zone sensor signal, no further packages will be transported either into or out of the zone. The rest of the conveyor continues to function. After resetting this error, local initialization occurs depending on the PZ17 setting.
If PZ15 = 0 has been set, there is no local initialization.
- The default setting is *Zone stop + LED flashing*.
- PZ17** *RDErrorRecovery*: With PZ17 it can be specified for the selected zones if, on resetting a RollerDrive error, there is local initialization (*Local Init*) or not (*No Init*). The default setting is *Local Init*.
If PZ15 = 0 has been set, there is no local initialization.

Appendix

PZ18 *SensorErrorMode*: With PZ18 it can be specified for the selected zones how the module should react if the connected sensor reports low gain and the low gain signal becomes active.

- If *Ignore error* is selected, the error is determined by the corresponding module but it is neither shown nor output and conveying is not stopped. It is highly likely that the error will be subsequently detected by a logic error. Packages may crash into each other.
- If *LED flashing* is selected, the error from the Fault-LED is displayed on the relevant module and output via a correspondingly parameterized ComControl output. Conveying is not stopped. After remedying this error there is no local initialization, even if this is selected via PZ19.
- If *Zone stop + LED flashing* is selected, the error is displayed via the Fault-LED on the relevant module, an error is output via an correspondingly parameterized output on a ComControl and the RollerDrive in the zone is stopped. The error can only be reset by resetting the low gain signal of the relevant sensor. For this, the sensor must be cleaned. Interrupting conveying means that regardless of the zone sensor signal, no further packages will be transported either into or out of the zone. The rest of the conveyor continues to function. After remedying this error, local initialization occurs depending on the PZ19 setting.

The default setting is *Zone stop + LED flashing*.

If PZ15 = 0 has been set, there is no local initialization.

PZ19 *SensorErrorRecovery*: With PZ19 it can be specified for the selected zones if, on deactivation of a sensor low gain signal, there is local initialization (*Local Init*) or not (*No Init*). The default setting is *No Init*.

If PZ15 = 0 has been set, there is no local initialization.

PZ20 *TemperatureRecovery*: With PZ20 it can be specified for the selected zones how the module is to react after temperature recovery (see "*Temperature protection*", page 12).

- If *No Init* is selected, the module starts to operate again immediately.
- If *Local Init* is selected the relevant zone performs local initialization (see "*Initialization*", page 11) and then operation is resumed.
- If *Power reset required* is selected conveying does not resume until the power has been reset.

The default setting is *Power reset required*.

If PZ15 = 0 has been set, there is no local initialization.

Appendix

PZ21 *PowerErrorMode*: With PZ21 it can be specified for the selected zones how the module reacts after a power error. A power error is output if a module registers voltage outside of the 19 – 26 V range.

- If *Ignore error* is selected, the error is determined by the corresponding module but it is neither shown nor output and conveying is not stopped.
- If *LED flashing* is selected, the error from the Fault-LED is displayed on the relevant module and output via a ComControl output. Conveying is not stopped. To reset the Fault-LED a power reset is necessary.
- If *System error* is selected, the error is displayed via the Fault-LED on the relevant module, an error is output via a ComControl output and the entire conveyor is stopped. To reset the Fault-LED and start up the module again, the error must be remedied and the power must then be reset.

The prerequisite for all three possibilities is that the modules have enough power to function / that the power is not so high that the module fusing has been triggered. The default setting is *System error*.

Control Mode Is only relevant for GatewayControl with CentralControl it is set to *Decentralized*.

NodeID Shows the number of the selected module which was assigned during construction and which is a synonym for the address.

ProductKey If the Configurator is connected with the ConveyorControl the Interroll article number is displayed for the selected module.

Serial If the Configurator is connected with the ConveyorControl the Interroll serial number is displayed for the selected module.

Appendix

Electrical data of connectors

Connection	Pin	Nominal value	Area of	Comment
Power		+24 V	19 to 26 V DC	harmonic-free DC voltage Current consumption: permanent 3 A _{eff} , max. peak current 5.5 A @ 500 ms, repetition rate 1 Hz
		GND	0	Functional earthing permitted, negative voltage not permitted
Data Data A1 Data A2				Bus communication, connection of non-system voltages and loads not permitted
RD RD left RD right	+24 V	+24 V DC	19 to 26 V DC	Overvoltage protection up to +30 V DC
	DIR	0 V DC	0 to +4 V DC	Level for counterclockwise direction of rotation
		+12 V DC	+7 to +12 V DC	Level for clockwise direction of rotation
	GND	GND	0	internally connected with the GND connection of the operating voltage, negative voltage not permitted
	ERROR	0 V DC	0 to +4 V DC	RollerDrive: no error
		+12 V DC	+10 to +12 V DC	RollerDrive: Error
	SPEED		0 to +10 V DC	Reference potential = GND (Power)
Sensor left Sensor right Zone Sensor Add. Sensor	Pin 1	+24 V DC	max. +26 V DC	max. current load: 100 mA
	Pin 2	0 V DC or +24 V DC	0 to 26 V DC	Signal input
	Pin 3	GND	0	internally connected with the GND connection of the operating voltage, negative voltage not permitted
	Pin 4	0 V DC or +24 V DC	0 to 26 V DC	Signal input
Input 3	+24 V	+24 V DC	max. + 26 V DC	max. current load: 100 mA
	Signal	0 to +24 V DC	0 to +26 V DC	
	GND	GND	0	internally connected with the GND connection of the operating voltage, negative voltage not permitted
Output 1 Output 2	+	PNP switching output (NO)		switches against operating voltage of the module (nominal value = + 24 V DC), active = switched, not active = blocked, max. load current 0.5 A, overload- and short-circuitproof, no overvoltage protection
	-	GND	0	internally connected with the GND connection of the operating voltage
Relay	a/b	NO relay contacts (electrically isolated) Switching capacity: max. 24 V / 2 A		Switching capacity data applies to ohmic load
USB		USB 2.0		Only permitted for use as a data interface

Appendix

Installation declaration

in accordance with the EC Machinery Directive 2006/42/EC, Appendix II B,

the manufacturer:

Interroll Engineering GmbH
Hoeferhof 16
D - 42929 Wermelskirchen
Germany

hereby declares with sole responsibility that the product range

- ConveyorControl

is not a ready-to-use machine as defined by the EC Machinery Directive and, therefore, does not fully comply with the requirements of this directive. The commissioning of these conveyor modules is not permitted unless conformity of the entire machine/system in which they are installed has been declared in compliance with the EC Machinery Directive.

The health and safety requirements as stated in Appendix I have been applied. The special technical documents mentioned in Appendix VII B have been prepared and will be sent to the responsible authority if necessary.

Person authorized to prepare the technical documents: Georg Malina, Interroll Engineering GmbH, Hoeferhof 16, D - 42929 Wermelskirchen

Applied EC Directives:

- Machinery Directive 2006/42/EC
- EMC Directive 2004/108/EC
- RoHS Directive 2002/95/EC

Applied harmonized standards:

- EN ISO 12100 Parts 1 and 2 "Safety of machinery - Basic concepts, general principles for design" - Part 1: "Basic terminology, methodology" - Part 2: "Technical principles"

Wermelskirchen, 31st March 2012

Armin Lindholm
(Managing Director)

(This declaration can be obtained at www.interroll.com, if needed.)





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